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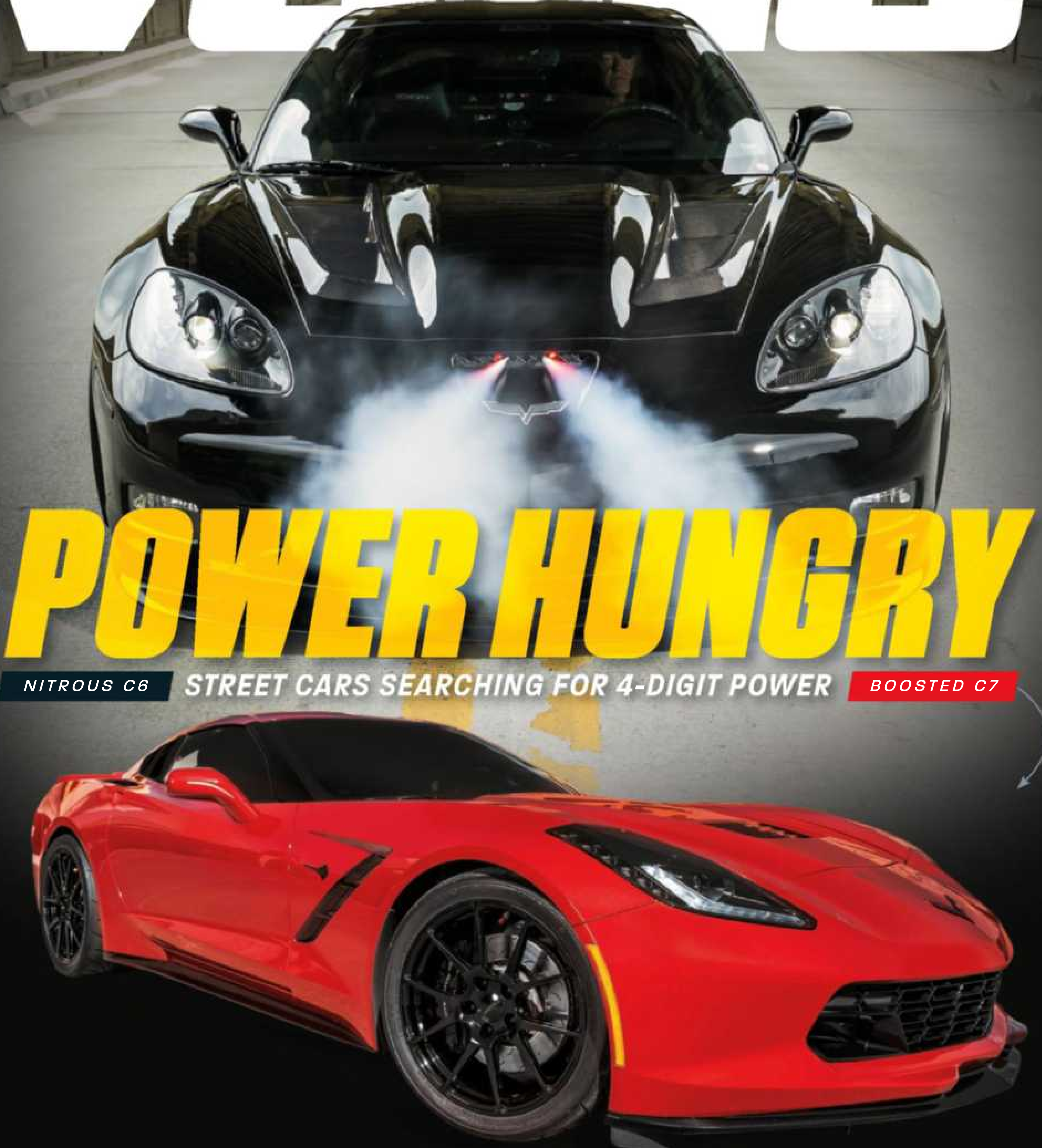
HARD ROCK CAFE C1 FOUND PAGE 78



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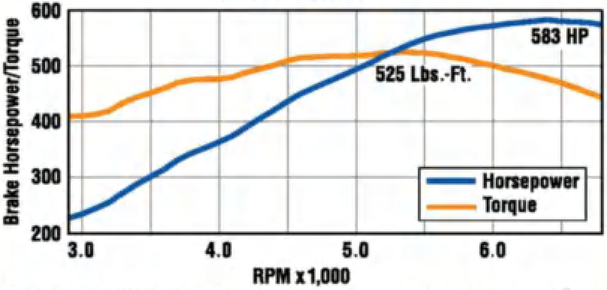

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.300"	231	171
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.500"	334	240
.600"	363	252
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*The sinister C6 nitrous purge was shot by **Grant Cox** (of Grant Cox Photography), while the boosted C7 was captured by **Kevin DiOssi** of Visceral Image. Both late-models are power hungry animals in search of prey.*

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THE GRID

SCOTT PARKER EDITOR

THE GORY TRUTH & SILVER LINING TO CHANGE

Over the years this job has taken quite a bit of adaptation. Many fought it—myself even at times. But now it's just expected that the way we do something today could be completely different next year. For example, when I first started we were still using film. The transition had just begun to digital photography. And at that time, the level of quality was not nearly as high as it is today. You need several thousand dollars worth of camera equipment and software just to keep up. Speaking of software, Photoshop was thought by many as just some form of trickery used by glamor magazines to make women look skinnier. Today, it is commonplace for someone to sharpen, crop, adjust color and even generate a double exposure. The days of emailing a story and mailing out your film are long gone as well. Now we have complicated software to manage all of this content. In fact, there is software for everything that you have to learn and relearn when it is updated the following year. It is a never-ending cycle, and you have to stay on your toes. It's simply not enough to be a good writer and editor of the printed word anymore.

The good part is that if you enjoy learning and you are multitalented, it can be fulfilling. I realized this last year when I left the company to start my business. As our duties expand and we are called upon to do more things, our careers begin to converge with completely different paths that we never even realized. For example, in my previous position I used web analytics to track and generate reports on each of the ten Tampa-based websites. This gave us some valuable feedback into what type of stories struck a chord with the audience, and who (specifically) the audience is in the first place. You'd be surprised to know that they can be much different than the people reading the magazine. So, in effect, web analytics allowed us to customize the product for different audiences. Now apply this to other businesses … this happens every single day. The digital age has brought about lots and lots of data (i.e., "big data"), which requires more and more people to track it and to interpret it. These positions didn't even exist 5-10 years ago! So as much as we plan for the future, it is impossible to predict what opportunities might arise. But the key is being open to them when they fall in your lap, and not being too complacent and comfortable where you are.

Sometimes it takes a wakeup call or a good, stiff kick in the behind to get us moving onto a different path. How long are you going to work for that boss you hate? How many days are you going to spend two hours in the car every morning with a pit in your stomach? We've all been there. Change can be a frightening thing, but the more you face it, the more empowering it can be to overcome it. Nearly every industry has been hit by some disruptive technology or development at some point, and companies must adapt to survive. It's no secret that *Vette*, and its parent company TEN: The Enthusiast Network, have gone through quite a bit recently. To that I can only say that these are (hopefully) the necessary steps to become a healthy and sustainable business. I look at my favorite sports team, the Philadelphia Flyers, which is perpetually up against the NHL's salary cap (instituted in 2005). They have had to make some hard decisions over the years, and more to come thanks to a few lengthy contracts that did not pan out. Like any organization they must get the most out of the team with limited resources. You can't buy your way to a Stanley Cup. Often you are forced to watch talented players walk out the door. The silver lining is that those players go on to have great careers elsewhere, and if you made the right decision it will be the best for the organization in the long run—a win-win. Between my sports teams (don't even get me started on Rutgers), various projects and everything else going in my life, it has been a challenging year both personally and professionally. But I always try to reflect on the past and the future to bring perspective to the present. **VETTE**

> "SO AS MUCH AS WE PLAN FOR THE FUTURE, IT IS IMPOSSIBLE TO PREDICT WHAT OPPORTUNITIES MIGHT ARISE. BUT THE KEY IS BEING OPEN TO THEM WHEN THEY FALL IN YOUR LAP, AND NOT BEING TOO COMPLACENT AND COMFORTABLE WHERE YOU ARE."

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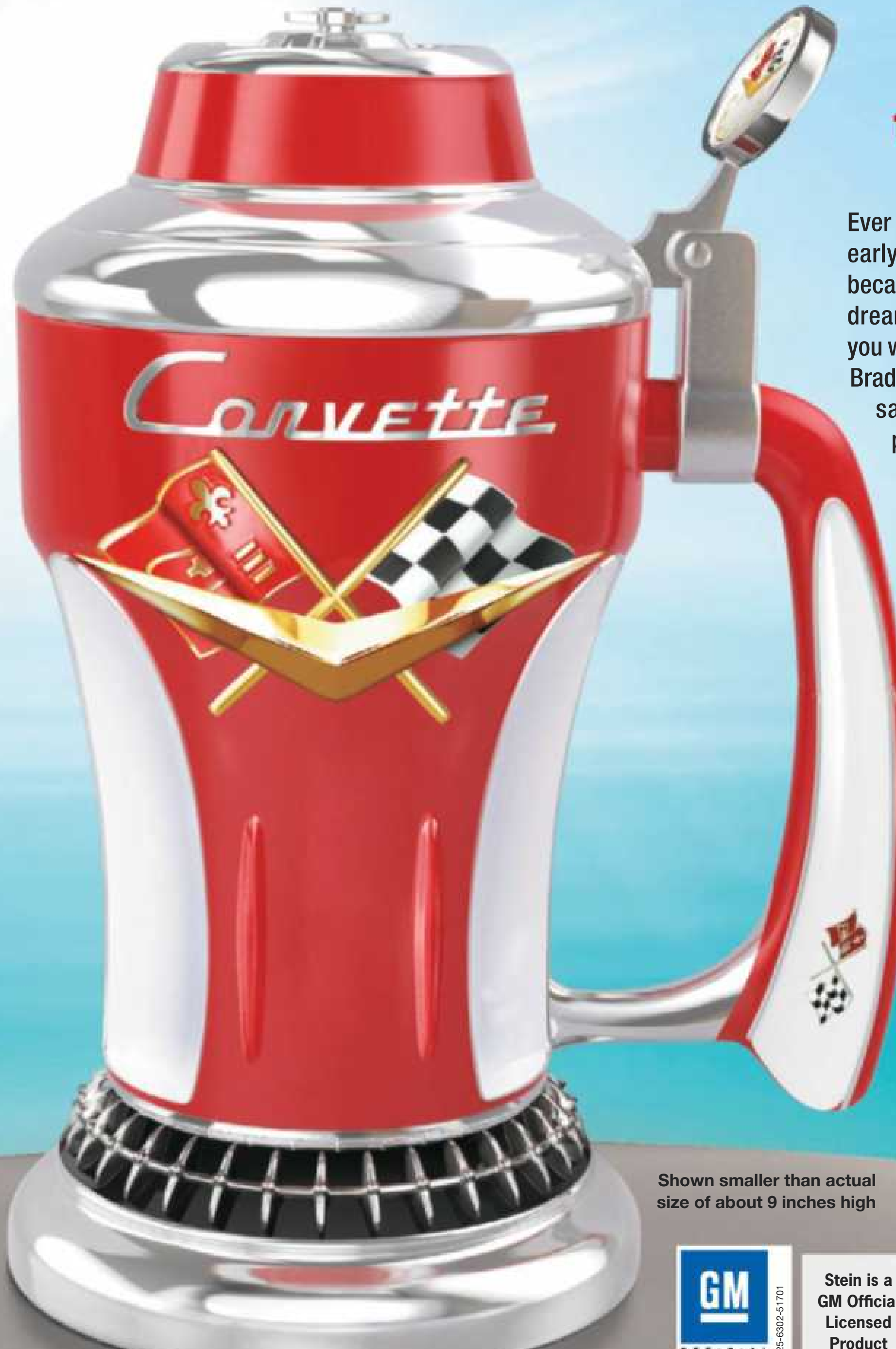

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FROM THE ARCHIVES

ROAD TESTING A “STOCK” CORVETTE

The quotes say it all. The 1956 Corvette that the editors at *Hot Rod* magazine tested back in 1956 may have started out as stock, but the finished product would go on to be a regular winner at sports car club events in California. It was even driven by Dick Thompson during his SCCA C-Production championship year.

As chronicled by *Hot Rod’s* Technical Editor Racer Brown in the October 1956 issue, the Vette was equipped from the factory with comfort accessories like power windows and a power top, but also with the hot, 240hp small-block with dual Carter carbs and Duntov cam. Behind the motor was a three-speed manual transmission along with 4.10 gears, while the chassis was set up with the factory’s heavy-duty suspension.

Since the car was intended for production-class racing, there were limitations as to just how much could be changed. Right off the bat the power top and radio were removed, shedding 70 pounds and bringing the Corvette down to a trim 2,900 pounds wet. They found the 52.5/47.5 front/rear weight distribution to be “quite favorable,” even though it gave the car a tendency to oversteer. “With the driver fairly close to the rear wheels, he can feel and correct for any lateral motion of the rearend before it gets carried away,” Brown wrote.

The Vette’s suspension was left alone for the most part, save for a re-arching of the rear springs to bring up the rate a bit. “The only other gimmick was to juggle tire pressures,” said Brown, with 27 (cold) psi in all four tires being optimal.

Those optional Firestone Super Sports were “not at all suitable for relatively ‘slick’ courses,” wrote Brown. “In fact, our test car was thoroughly trounced twice in road races simply because it couldn’t get a ‘bite.’” German Engleberts or Italian Pirellis would solve the traction problem, he said.

Brown found the Corvette’s 16:1 steering to be a little slower than, say, a Ferrari’s, but that it had a very nice feel to it. To help with “fast maneuvering,” the steering column was shortened by 2-1/2 inches, getting the wheel out of the driver’s lap. They also mounted a tachometer to that abbreviated column, since the gauge’s stock location in the center dash panel “makes quick and accurate reading somewhat difficult.”

Hot as the small-block was, it didn’t escape some tinkering by Brown and Petersen photographer Bob D’Olivo. The twin Carter carbs, especially, got a lot of attention. The progressive linkage was replaced with direct linkage “so that both carburetors can be operated in unison, as they should be,” Brown wrote. The idle was richened to eliminate “hesitations” and “stumbles,” and the carb floats were adjusted to alleviate the ’56 Corvette’s “strong desire to ‘drop dead’ in the turns.”

Brown also removed the “soggy mess” that was the Corvette’s plug wires and wire shields, replacing them with “a good grade of stranded copper or stainless steel cable…routed in such a way to clear the exhaust manifolds.” Timing was adjusted, and spark plugs were swapped.

When all the mods were made, “timed acceleration runs showed this particular Corvette to be a real bomb,” said Brown.

DREW HARDIN TEXT
BOB D'OLIVIO (PETERSEN ARCHIVES) PHOTOS

Zero to 60 came up in 6.3 seconds, and the average quarter-mile time was 15 seconds flat at just over 94 mph.

Better still, when the car was put in competition, "our test Corvette has proven to be perhaps the best performing one on the West Coast to date." Driver Bill Pollack earned several class and overall wins racing in California, while Thompson "decisively shut off three very fast Mercedes Benz 300 SLs for another overall first and first in class" in Seattle. Said Brown in sum, "The Corvette *can* beat a large share of the European competition at their own game." **VETTE**

PRODUCT PREVIEW

CHECK IT OUT

Once again, the folks at Lokar have a solution to dress up your hot rod's engine bay. The Hi-Tech LS Series Engine Dipstick Inner Cable and Knob Gauge to Fit is a direct replacement for the factory dipstick and handle that works with the OEM tube. It's designed to be easy to read, and has a billet aluminum handle in Brite or Black finish to match Lokar's Flexible Transmission Dipstick. The grip handle is easy to insert and remove, made in the USA, and comes with a lifetime warranty. Go to **www.lokar.com** for more information or call **877/469-7440**.

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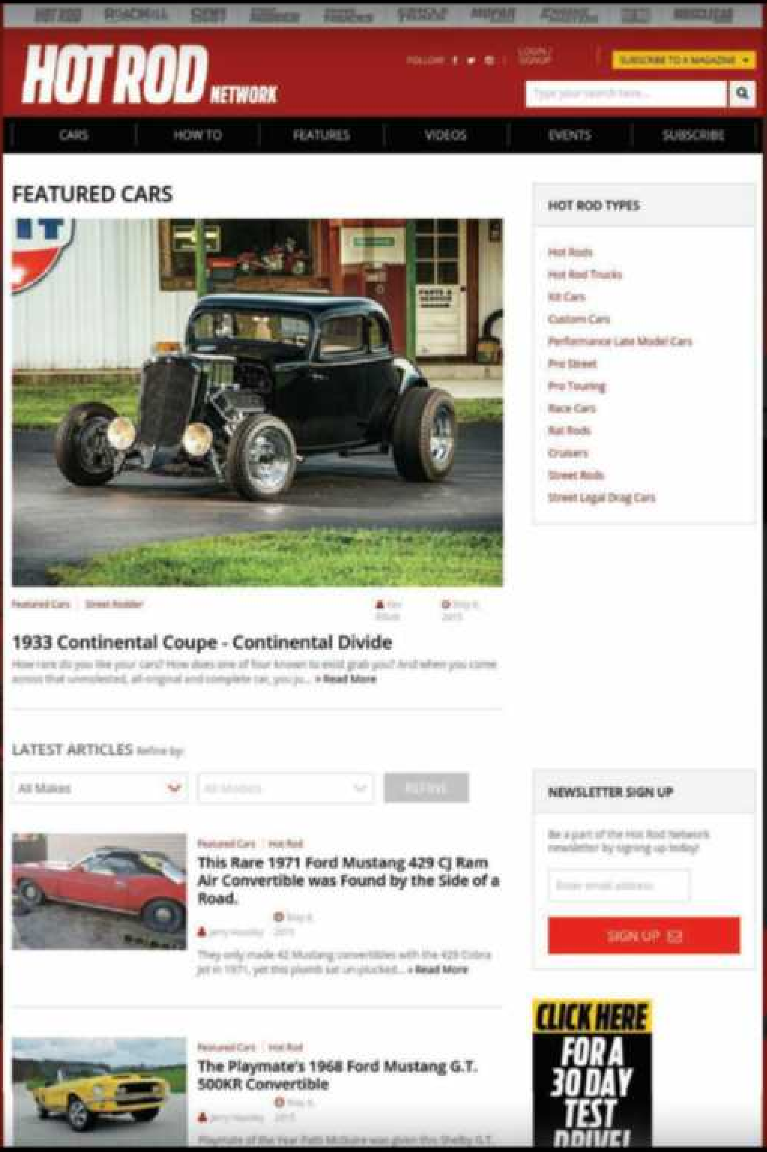

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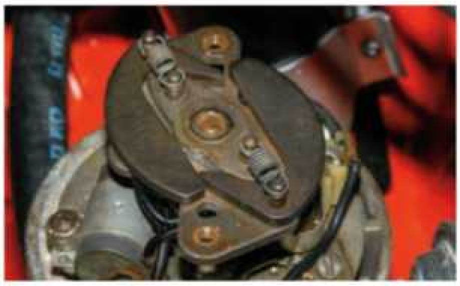

IN TUNE

PART 2: TUNE-UP TIPS FOR YOUR OLDER CORVETTE

Welcome back for Part 2 of tune-up tips for your older Corvette. Last time we talked about tricks of the trade when setting points. This month we will talk about setting ignition timing.

ADJUSTMENT ORDER

The most important thing when performing a tune-up on an older vehicle is to complete the adjustments in order. The first step is to set the ignition points, then the ignition timing and finally adjust the carburetor.

The points should be set first because changing the point gap will change timing, but changing the timing will not effect the point gap (or dwell).

The carburetor settings should be set last because carburetor settings will not affect the timing, but timing adjustments will effect the carburetor settings.

SIGNS OF INCORRECT TIMING

Signs of incorrect ignition timing can include: hard, erratic cranking while starting; spark knock on acceleration; low power on acceleration; vehicle overheating and decreased fuel economy. Remember, ignition timing is always set after you have adjusted your points.

ELEMENTS THAT CONTRIBUTE TO TOTAL TIMING

In vehicles equipped with a points or first-generation HEI (High Energy Ignition) distributor there are three different elements that contribute to timing:

a) Initial timing or base timing—this is what you set with a timing light by moving the distributor when the vehicle is idling.

b) Mechanical advance—which consists of the initial timing plus the centrifugal advance. The centrifugal advance system in the distributor advances spark timing purely as a function of engine rpm.

c) Vacuum advance is intended to advance the ignition timing at idle since the engine needs more spark advance at idle in order to fire the leaner fuel mixture.

WHAT IS TOTAL TIMING

Total timing is the amount of advance added by the distributor combined with initial timing.

Most stock Corvette V-8 engines will produce peak torque and power with a total timing advance of 36 to 38 degrees at approximately 2,500 rpm. This can be checked with a timing light that is equipped with a degree knob, and is one of the best ways to set timing.

If your timing light does not have a degree knob, timing tape can be used on the harmonic balancer to achieve the same result.

CENTRIFUGAL ADVANCE

The centrifugal advance system in the distributor advances spark timing purely as a function of engine rpm. The amount of advance added by the centrifugal advance system is accomplished by using weights and springs on the autocam mechanism located directly under the rotor button. The spring length and tension determine what rpm spark advance occurs.

The faster the distributor shaft turns the more the weights move outward due to centrifugal force. This allows the rotor button to move on the autocam and the spark timing to advance.

The speed at which the weights move outward is controlled by the tension of the springs on top of the autocam.

How fast the spark advances is controlled by these springs and weights. A lighter spring will let the timing advance faster at a lower rpm. A stronger spring will slow the timing advance through the rpm range.

There are many different calibrations of these centrifugal weights. It is important to make sure the correct distributor is installed in your car. While any distributor laying on the shelf may fit in your Corvette, the point in the

QUESTIONS?

Got a question for our Tech Corner expert? Just jot it down on a paper towel or a lightly soiled shop rag and send it to us at *VETTE* Magazine, Attn: Technically Speaking, 1821 E. Dyer Rd., Suite 150, Santa Ana, CA 92705. Alternatively, you can submit your question via the Web, by emailing it to vette@enthusiastnetwork.com. Be sure to put "Technically Speaking" in the subject line.

rpm range where the weights begin to move and fully extended has to be calibrated specifically for that engine and transmission package.

VACUUM ADVANCE

The vacuum advance is intended to advance the ignition timing at idle since the engine needs more spark advance at idle in order to fire the leaner fuel mixture. The vacuum advance is also designed to respond to sudden changes in operating conditions by helping provide the correct spark advance based on engine demand.

This is accomplished on pre-emission vacuum advance vehicles by using engine manifold vacuum to rotate the distributor plate counterclockwise, which advances the opening position of the ignition points, therefore advancing the ignition timing when vacuum is applied. When the engine rpm increases, it's possible that an over-advance ignition timing condition could occur causing engine detonation (pinging on acceleration) and a reduction in optimum power. The vacuum advance is able to regulate ignition timing by using engine vacuum to retard the timing. When the throttle is opened, manifold vacuum will essentially drop to zero causing the vacuum advance to retard timing by rotating the distributor plate clockwise. So as you can see, the vacuum advance should use manifold vacuum as its source on pre-emission Corvettes.

When testing your vacuum advance, use a vacuum pump to apply vacuum to the vacuum advance and make sure the plate rotates. The vacuum advance should hold vacuum. If not, the internal diaphragm may be ruptured. These are calibrated units and must match the factory rate of pull. So make sure to replace your vacuum advance with the correct unit based upon the distributor number. An adjustable style vacuum advance can be found for performance applications.

The airflow through a carburetor and the intake system creates various low-pressure regions. These low-pressure regions are sources for vacuum. To better understand the differences between manifold and ported vacuum let's look at the position of the orifice. If the orifice in the venturi for the vacuum port is below the throttle plates of the carburetor, that port will have manifold vacuum. If the orifice in the venturi is above the throttle plates of the carburetor it is ported vacuum.

To test a port to determine if the vacuum is manifold or ported, connect a vacuum gauge to the port. At idle, if the vacuum gauge reads 15-20 inches of vacuum this is considered to be manifold vacuum. If no vacuum is shown at idle; but as you open the throttle you start to read vacuum; this is considered to be ported vacuum.

After years of controlling vacuum advance with manifold vacuum—along came emissions requirements that forced the reduction of hydrocarbons and nitrogen in the exhaust gases. One primitive method employed to reduce emissions was to switch the vacuum advance from manifold vacuum to ported vacuum.

When the spark timing was retarded at idle by moving the vacuum advance from manifold to ported vacuum, cylinder combustion begins late and this does two things, which are important for emissions:

a) This causes a reduction in combustion chamber temperatures, which in turn reduced the nitrogen produced.

b) This also causes an increase in exhaust gas temperature, which helps burn off hydrocarbons in the exhaust gas stream when fresh oxygen is introduced by the air pump.

As a result of moving the vacuum advance from manifold to ported vacuum, engines ran poorly with enormous amounts of heat energy being transferred through the exhaust port walls into the coolant, causing the typical engine to run 15 to 20 degrees warmer. Combustion efficiency was also affected, causing a reduction in fuel economy. A slightly rough idle also commonly occurred when the vacuum advance was moved to ported vacuum.

Well, now we have understanding of how points work and how to set them as well as all the elements that contribute to total timing, we are well on our way of performing a complete tune-up. **VETTE**

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BY **SCOTT PARKER** | PHOTOGRAPHY BY **KEVIN DIOSSI**

THE QUEST FOR MORE POWER IN A BOOSTED C7

“After this, I am done.” If you hear Brian Babernitch utter these words, don’t believe him. The man is a liar. He swore he’d keep his 2014 Corvette Stingray stock. Then, he claimed an ECS supercharger kit would be enough. He said the same after a methanol kit. And again with exhaust and wheels. Yet again with headers, cam and stroker kit. Then he put a bigger blower on. And then he increased the boost. The Stingray has made 1,118 rwhp on Florida Speed & Power’s Mustang dyno and he’s already got an order in for driveline upgrades, billet intake, 103mm throttle body, an even bigger blower, widebody kit and other goodies. There’s just no stopping Brian Babernitch.

Rewinding a second, Brian purchased his Stingray from the appropriately named Stingray Chevrolet in Plant City, Florida. The Ruskin (Florida) native loved the look of the C7 when he first laid eyes on it in early 2013, and took delivery of it in mid-September. Brian has had some notable rides in recent years, including a 2006 Lamborghini Gallardo and a 2011 Porsche Panamera 4S, the latter of which he still owns. But it was the “ludicrous amount of power” that could be had with the C7’s new Gen V LT1 that brought him back to American muscle. Shortly after purchasing the C7, he became well aware of the numerous new parts available to upgrade it. The East Coast Supercharging blower kit was the first modification in early 2014, and it radically changed the Stingray. Brian returned to Florida Speed to install and tune a methanol injection kit, and it was all downhill from there.

In current trim, the LT1 block has been machined by Late Model Engines in Houston, and fitted with a Callies Magnum crankshaft, Wiseco gas-ported pistons and Callies Ultra H-beam connecting rods. The Gen V specs 416 cubic inches with a 4.070-inch bore and 4.000-inch stroke. Despite high levels of boost, direct-injection still allows for 10.5:1 compression. The cam is a hydraulic roller with 225/237 degrees of duration at 0.050, 0.648/0.658-inch lift and 118+4 LSA—healthy but not necessarily what you’d expect for so much power. LME CNC-ported the heads as well, and upgraded the valves with Manley’s Severe Duty versions. The rocker arms are fitted with Brian Tooley Racing trunnion upgrades. At present, the intake manifold and throttle body are stock, and the exhaust meets its final destination with efficiency thanks to American Racing 2-inch headers, 3-inch off-road crossover pipe and a Corsa Xtreme 3-inch catback.

The high-lift cam, CNC-ported heads and big headers make good use of the Paxton Novi 2200R blower from the intercooled ECS kit. It cranks out 22 psi using a 2.95-inch upper pulley and 8.3-inch lower pulley. Prior to a pulley upgrade it was making 850 rwhp with the smaller 1500 blower in the base kit. The forged rotating assembly was a must for this much boost, as were fuel system upgrades. Florida Speed used the Z06 fuel pump and a custom, low-pressure auxiliary fuel system to feed it. A dual-nozzle methanol kit provides additional cooling, but also supplemental fuel that is ignited with NGK TR7IX plugs. The ECM was tuned with the stock MAF and 3-bar MAP sensor. To date it is the highest powered boost-only C7.

Since the Stingray makes 1,016 lb-ft of torque, it was necessary to make a few more upgrades to keep carnage to a minimum. A Mantic 9000 Series triple-disc clutch and billet steel flywheel backs up the stock TR-6070 seven-speed transmission. Brian grabs gears with an MGW shifter. The driveshaft is stock, but the axles have been upgraded to the Driveshaft Shop's Level 5. Pfadt coilovers were installed to keep a handle on things, so the C7 doesn't get away from him. The sway bars and brakes are stock Z51. Forgeline GA1R in 19x9 and 20x11 were sourced from Weapon X Motorsports to mount the sticky 265/35/19 and 315/30/20 Toyo R888s. However, with this much power, they don't stand a chance. That is at least partial motivation for the widebody upgrade with larger meats.

For the time being, the Stingray has a few subtle appearance touches inside and out. ACS side skirts and a Weapon X spoiler, wrapped in Xpel Opticoat, complement the Crystal Red Metallic paint. The steering wheel was sourced from Caravaggio for a D-shaped piece befitting a car of this caliber. And the A-pillar is adorned with PLX wideband O2, OBD-II multi-purpose and boost gauges.

Back when the C7 still had the Novi 1500 blower it went 10.4 at 135 mph with a traction-limited 2.0 short-time. However, besides street time, Brian is much more focused on the 1/2-mile. Seeing as though the car currently spins the tires in Fourth gear, it is easy to see why it needs a longer piece of tarmac to stretch its legs. The goal is to break the boost-only record by going 180-190 mph. That's cooking.

With said goals and a ProCharger F-1X on the way, I certainly don't believe Brian when he says: "After this, I am done!" The new setup should make over 1,300 rwhp and I have a feeling that doesn't even begin to describe where this Stingray is going. "I gave them a blank slate with the car when we decided to start modding it and always trusted them to do whatever they wanted to make this car the baddest C7 on the planet, and they have exceeded my expectations." **VETTE**

PAVEMENT PUNISHER

MIKE FISHER'S 2008 Z06 HITS HARD AND DOESN'T MAKE EXCUSES

BY **STEVEN RUPP** | PHOTOGRAPHY BY **GRANT COX**

Mike Fisher has spent over 60 years on this spinning ball of dirt and in those many years he's figured out one truth about himself, he likes stuff that's fast. Fast boats, fast bikes, and most of all fast cars. Which brings us to his current ride: a 2008 C6 Z06. Mike has wanted a Z06 since he first spied a C5 version, so it didn't take much persuading from his son Brandon to talk him into buying the '08. "He pushed me to build the Punisher into what it is today. He went to all of the car events and drag races; he was my team and he also helped with a lot of the custom installs, from the chassis to the ground effects," recalled Mike. The Corvette was found on Craigslist in May 2011 and it had a scant 1,826 miles on the clock. The Corvette didn't have a scratch and was so pristine that the owner wouldn't even let Mike sit in it or take it for a test drive. Mike relayed, "I made an offer and he wouldn't bite, so I left my phone number and walked away. Two days later he called and accepted my offer. That's when it all started."

Brandon brought some of his friends into the project and before long the Vette began to get rolling. As Mike told us, “A friend of my son, Tanner Popp, helped with a lot of mechanical changes such as differentials and engine components, while Bobby Oberlander and Jak Welch were brought in to lend a hand on other aspects. We lost Brandon in 2013 and I credit these men for helping me back to my love of hot rods. I don’t know if I will ever part with this car since it has my son’s fingerprints, and his love, all over it.”

The plan called for fast, so the area that got the most attention was the engine. The 427 LS7 was pulled and while the short-block was left stock, it was topped with a set of high-flowing Mast Motorsports Black Label 12-degree LS7 heads. MC Racing in Overland Park, Kansas, slid in an aggressive 243/259-deg. duration (at 0.050), 0.691/0.702-in. lift, 112-LSA camshaft that really upped the LS7’s power output and gave it an especially gnarly exhaust note. Other changes to the engine included upgraded COMP trunnions for the 1.8 ratio GM rockers, FAST LSXr 102mm intake, Nick Williams 102mm throttle body, MSD wires and Dynatech headers with off-road X-pipes. But more air and a big cam can only take you so far, so Mike had Terry Murphy Race Cars in Blue Springs, Missouri, add a little something extra, a healthy shot of nitrous. A Nitrous Express system centered around twin 10-pound bottles sends a 150-horsepower shot of go to the worked-over LS7 at the touch of a button. The nitrous system has its own dedicated fuel system and when the switch is flipped it will add to the 594 rwhp the LS7 makes on motor alone. The fastest quarter-mile to date is 10.28 at 134 mph without nitrous, so we can’t wait to see what it does with the extra motivation.

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Other key mods to the Vette include LG Motorsports drag spindles as well as smaller Baer rotors and C5 calipers to clear the Weld Racing V-Series 15x10 rear wheels. This helps stuff a meaty 325/50R15 Mickey Thompson ET Street Radial in the wheelwells with matching Weld 17x4.5 and MT skinnies up front. The Tremec TR-6060 six-speed is stock, and benefits from the addition of a Centerforce DYAD clutch to help hold all the newfound power. As a street/strip setup, the stock Z06 suspension has so far served Mike well. Though some modification was required to the lower rear A-arms for wheel clearance.

Lots of body mods can be found, like the ground effects kit and the carbon-fiber hood with the ghosted Punisher logo. It makes for an ominous looking ride that's as good looking as it is fast. Visual Imagination in Missouri did the black paintwork, which included three coats of clear over the black base and graphics. The interior was upgraded with NRG carbon-fiber seats, quick-release steering wheel, and a five-point harness system secured to the custom RPM rollcage. There's also a trio of A-pillar-mounted auxiliary gauges to track the LS7's vitals. It's all business with enough style to stand out from the other rides at the track.

In the end, the Z06 fits with what Mike envisioned when he started the project with his son. Mike remarked, "It's exactly what we wanted and it never would have happened without the help of my son and the support of my wife, Robin. It's stupid fast and with the cutouts open has the sickest sound around. I might try to get it up to 1,000 rwhp, but for now it's truly a dream machine and the late-model hot rod I've always wanted." **VETTE**

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BY **STEVE TEMPLE**

HEARTBEAT

Who hasn't felt their pulse quicken at the sight of a Corvette? And for many, that experience gets into their blood, and beating in their chest as a lifelong passion. Just ask Sandy Redden. When she met her husband, M.J., marrying him in the early '70s, "I was driving a red '63 Corvette roadster, a car I absolutely loved." She had it modified with fender flares, side exhaust, stinger hood, custom paint and one of M.J.'s race-car engines. Then heartbreak ensued in 1978. One night he drove the Vette to pick up a prescription at a local drug store. He parked the car in the shopping center lot and when he came out, to his surprise her beloved Corvette was gone—stolen. "When we finally realized after a few months the car was not coming back, he made me a promise that some day he would replace it," Sandy recalls. The promise went on the back burner, though, due to their need to complete a new home, and with children to rear, as well.

Fast forward 20 years: M.J. suffered from a cardiac problem of another kind, and had just come home from having open-heart bypass surgery in June 1998. What would it take to heal the pain? While reading the local newspaper classifieds, he found a '75 Corvette coupe. "Insisting that we go look at it, he called and made arrangements to see it," Sandy relates. "I was reluctant, knowing that he wasn't cleared yet to even go on a drive, let alone checking out the car." But M.J. told Sandy that she knew enough about cars to do any physical inspection that was needed, which included crawling under and checking out the frame. Turns out his confidence was somewhat optimistic, as it needed more work than she realized.

Since M.J. has restored dozens of Corvettes, he figured he could do all the work himself. It was reasonably priced, what they could afford at the time, so they made a deal. "It wasn't a '63 red roadster, but his promise was kept and I was now the owner of a yellow '75 Corvette coupe," Sandy smiles. In August 1998, M.J. began a complete frame-off restoration, and it became his physical therapy after his heart operation. Bringing back an old Corvette from the edge of oblivion would also bring back his ticker, too. "I would often come home, stressed out from work and dealing

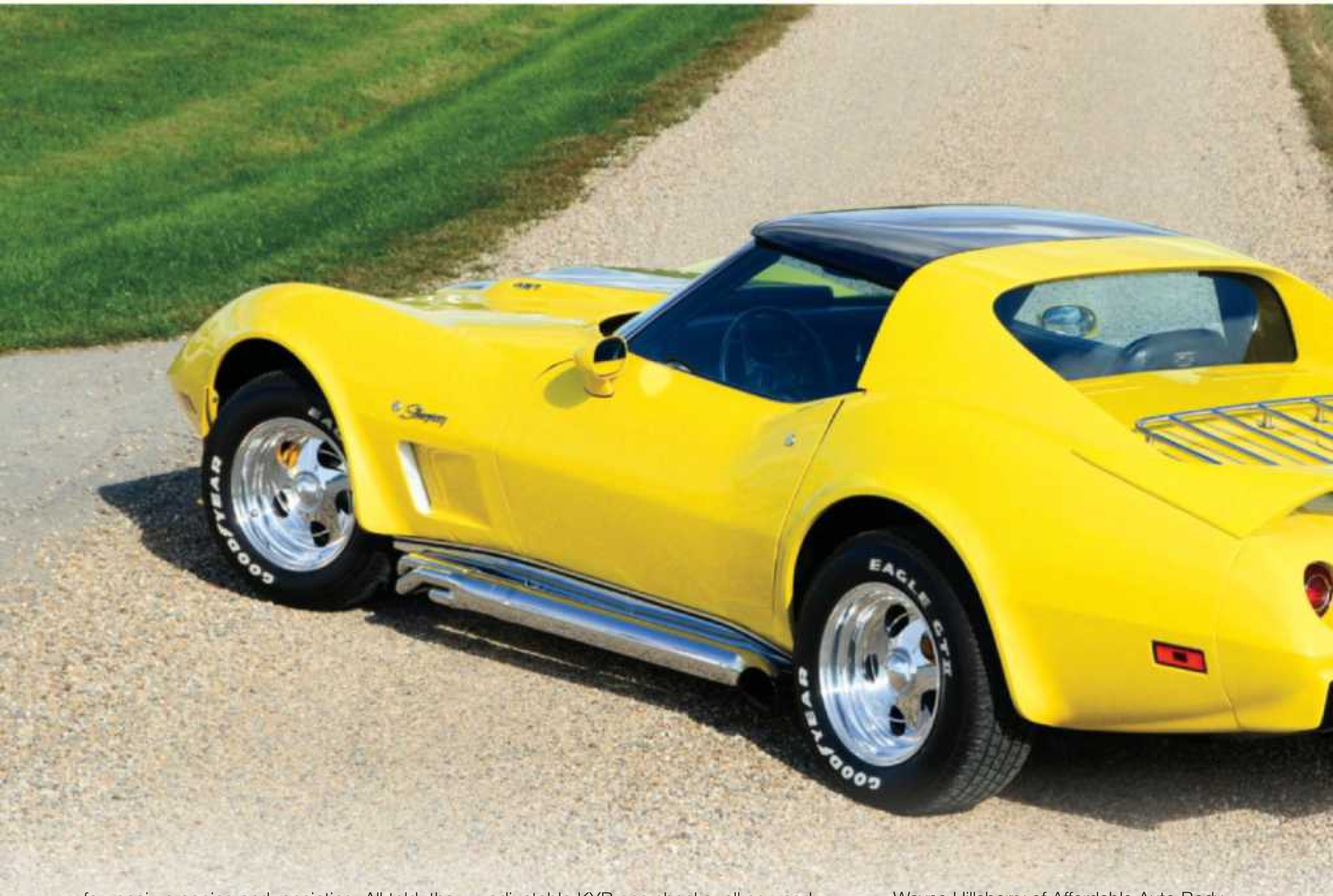
HOW A '75 CORVETTE STOLE A WOMEN'S HEART—AND THEN IT RECEIVED A TRANSPLANT

with employees," he recalls. But as soon as he walked into his shop at home, "I was in heaven. It was a lot of fun building her car for her."

M.J. thrived on the challenges he encountered, such as fixing the corrosion. "There's a typical rust area in the kick-up of the frame, just forward of the rear wheels," he explains. "A triangular area on top accumulates road salt from the front wheels, and eats away at the frame." Sometimes he's had to make a jig to fix a badly rusted frame, but this one wasn't that far gone. All he had to do was cut out the bad metal, going about half-inch into the good sections, and then weld in patches on both sides. To prevent the rust from recurring, he applied a waxy undercoat, and shot it inside the rails, as well. He prefers using the 3M product No Drip Rust Proofing 4L, an amber-colored solution that he leaves out in the hot sun to dry until it stops dripping off the frame.

There was more to the history of the car's condition, however. The people selling it said that it had been a gift for their daughter when she graduated high school. After owning it for about 15 years, she eventually outgrew the car, and it sat idle. Even though stored during the winter months, it was not in a dry place, since the car smelled of mildew and the ripped and broken interior was simply not salvageable. To rectify that portion of the project, M.J. acquired a whole new set of seats and carpeting from Al Knoch Interiors. While at it, he also installed woodgrain inserts and a radio, antenna, and dual rear speakers from Mid America.

Fortunately, Sandy's replacement Stingray was otherwise intact and completely stock. It had never been wrecked, and the engine started and ran. Even so, the original bumpers were cracked and the paint was chipped and worn—typical for Corvettes of this age. The car was completely disassembled and the body was sent to a shop



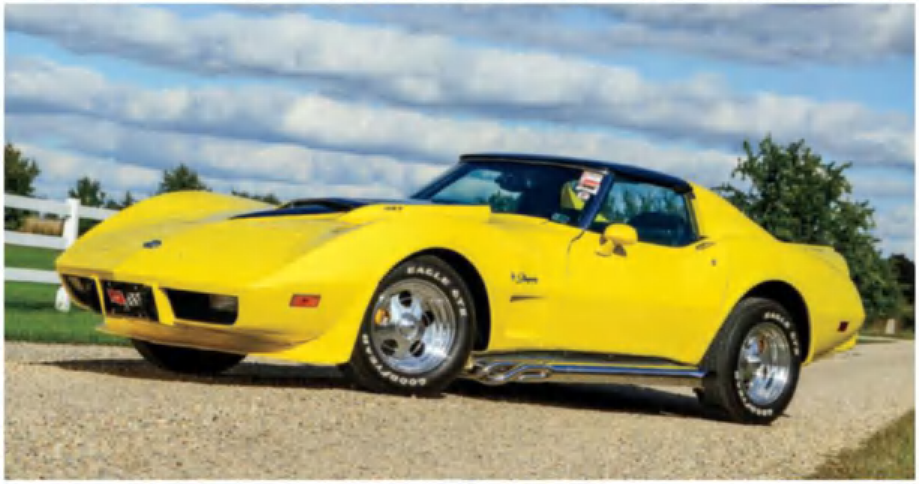
for repair, prepping and repainting. All told, the entire project took three years, working in the evenings and on weekends. "I helped as much as I could," Sandy recalls, "holding wrenches, handing him tools, bleeding brakes, cleaning parts. Most of the time I could help by just going back into the house," she admits. Initially, M.J. wanted to restore it back to original, but he realized it would take even more effort and ingenuity to keep his wife happy.

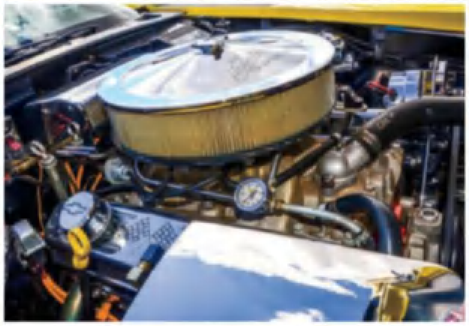
"I wanted it to be different," Sandy insisted. "It was my car and I wanted it my way." So that's where the modifications came in: the front apron, rear spoiler, side pipes, custom rims and sportier side mirrors. Chassis mods included shorter coilover front springs and a fiberglass rear transverse spring with adjustable KYB gas shocks, all sourced from Mid America. With the new chassis setup, "it settles into curves better," M.J. reports. And it now stops better, too, with Baer brakes, using drilled and slotted rotors at all four corners.

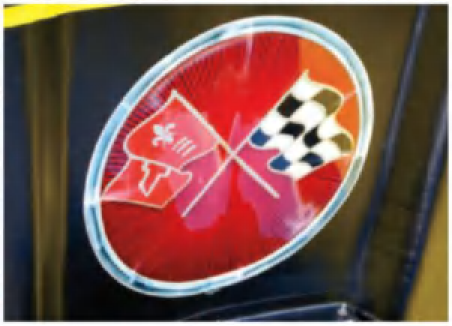
While the Goodyear Eagle GT 235/60 rubber is a stock size, the wheels were a bit more involved, as he didn't want to use any adapters. Instead, he contacted Budnik and requested custom 15s with exact offsets. This request required a significant upcharge but he feels it's worth every penny because without it, "the center doesn't fit as tight, so it starts working and the lug nuts get loose."

One thing they didn't change though, was the original color: Bright Yellow, sprayed by Wayne Hillsberry of Affordable Auto Body. While there were no significant modifications to the original body style, they found an Astro one-piece acrylic panel to replace the factory T-top, which really made the car stand out. Not only that, it eliminated any leaks, a problem M.J. has often seen on other customer cars. "I've known Corvette owners who keep towels in the cockpit just to sop up all the rainwater that comes in," M.J. notes, adding that the T-top can't be adjusted easily. To prevent that from happening, he aligns the Astro panel using three sheets of paper in the windshield seal. Once those sheets can't be pulled out, he knows he has a virtual waterproof seal.

Of course, a project car is never really done. "I drove it this way for about six years," Sandy







adds, until she had to find some relief to her frustration. "I asked for more horsepower because I had a hard time keeping up with my husband's car," she scowled. That frequent occurrence was particularly embarrassing, especially for a Corvette owner, since M.J's other car is an '84 Pontiac Fiero. But not just any Fiero—it's armed with a 650hp engine backed by a drag-racing transaxle. He toyed with the idea of putting a 502 engine in Sandy's Corvette, but that would have entailed modifying the mounts and headers.

"That's when we decided on the 383 small-block," M.J. says. "It would be an easy fit and we didn't have to change the headers and side pipes." He ordered a bare ZZ4 block with an assortment of special parts, since a crate version wasn't available. Bored, stroked and clearanced by Elmer's Engines in Wexford, Pennsylvania, this custom-built mill delivers a lot more horses than either the 165hp ZQ3 or 205hp L82 available in 1975. It's topped with a Demon 850 carb on a GM dual-plane aluminum manifold, along with aluminum Fast Burn heads actuated by a COMP Cams roller bumpstick. Hooker headers and side pipes blow out the exhaust gases. The engine is mated to a Turbo 350 automatic with a shift kit and a Hughes 2,500-stall converter. The dramatic increase in power from the 383 kept Sandy happy for a time, but three years ago she wanted to change up the looks with a slight makeover, and had a Stinger Hood installed with a black center and pinstriping, custom painted with a Corvette logo underneath.

Over the years the car has been awarded a baker's dozen worth of various trophies, in between cruises and a few trips to local dragstrips. They've won so many Celebrity Picks at Mid America's Funfest that they promised Mike Yager ("Chief Cheerleader" at the company) to bring a different Corvette to next year's event. Looking back on her experiences behind the wheel, "It's a promise well kept from a great husband," Sandy says. "It always puts a smile on my face and keeps me young at heart." That puts a new twist on an old saying: it can take a long time—and a couple Corvettes—to become young. **VETTE**

CHANGE OF PACE

GREG DAMRON'S 1959 CORVETTE IS A MODERN TAKE ON A TIMELESS DESIGN

BY **TOMMY LEE BYRD** | PHOTOGRAPHY BY **THE AUTHOR**

The 1950s had an abundance of iconic designs that changed the automotive industry in a good way. Horsepower figures were increasing and exterior designs continued to get more elaborate. While the Corvette was Chevrolet's most expensive offering, it kept a subdued appearance through the early '60s compared to its big brother, the Impala. By 1959, the Impala was over-the-top with crazy fins and lots of chrome, while the Corvette actually lost some of its trim for the 1959 model. Even then, the Corvette still looked like a dainty roadster that wouldn't handle a beating. Over the years, many racers have proven that assumption wrong, but a modern interpretation of this design needs a little more meat on the bone to get the job done.

Kentucky resident, Greg Damron wanted to go the modern direction with his 1959 Corvette, and enlisted the help of B Rod or Custom, a shop located in Knoxville, Tennessee. Larry and P.J. Burchett have built a number of Corvettes, and Greg's car is yet another notch in the belt for this father and son team. The goal was simple—build a high-end Corvette that is fun to drive and easy on the eyes.

The solution involved rolling the original frame and drivetrain out from under the car and replacing it with modern equipment. First

was the chassis and suspension, and Greg went with a Chassis Concepts rolling chassis, which features a rebuilt C1 frame with stock C4 suspension. Up front, aluminum control arms are suspended by a transverse leaf spring and stock-style shock absorbers. A hefty sway bar keeps the car level in the corners, while a C4 rack-and-pinion offers quick steering response and a much lighter design than the stock box and linkage. The Chassis Concepts frame features a C4 independent rear suspension, equipped with a 3.08:1 gear ratio, a limited-slip differential and the stock-style transverse leaf spring suspension. C4 disc brakes are assisted by an ABS Power Brakes electric booster system with a custom aluminum master cylinder.

While the chassis was a huge step into the modern world of performance, the engine is even more impressive. A standard 283ci small-block Chevy would've originally given this Corvette about 230 horsepower, and the new LS3 under the hood cranks out 430 horsepower in stock form. The stock crate engine comes in at 376 ci (6.2 liters) and features an all-aluminum construction for a tremendous amount of weight savings. The LS3 features a 10.7:1 compression ratio, combined with the potent L92-style cylinder heads, which are the hot ticket for big-time airflow

and horsepower. Inside the block you'll find a hydraulic roller camshaft that features 204 degrees of duration on the intake side and 211 degrees of exhaust, measured at 0.050-inch lift. The total valve lift, factoring in the 1.7:1 rocker arms, is 0.551-inch on the intake and 0.522-inch on the exhaust.

The LS3 engine is fit into the C1 chassis utilizing a set of Hedman headers, which lead to 3-inch piping and Flowmaster mufflers. A Griffin aluminum radiator improves engine cooling, while the engine accessories are driven by a Vintage Air Front Runner serpentine belt system. Fresh air enters the throttle body through a custom twin-filter air intake built by Top End Fabrication.

The LS3 is a beast of an engine that weighs 130 pounds less than the stock 283, puts out 200 more horsepower and can get upward of 30 miles per gallon on the highway. This fuel efficiency is due in part to the reduced weight of the car, along with the perfect combination of rearend gearing and ratios inside the 4L65E four-speed automatic overdrive transmission.

In terms of aesthetics, Greg's Corvette is all about the details. There are a few body modifications that you may not notice, but the guys at B Rod or Custom are known for making cars look like they "should've been that way" from the factory. Larry Burchett carefully sliced and diced the rear portion of the body in order to fit the 18x9.5 Schott wheels and Nitto 295/45R18 tires into the very constrained wheeltubs. Fitting the 17x8 front wheels and accompanying Nitto 245/45R17 tires required no modifications, when using C4 suspension. Countless hours of fiberglass work was necessary to reconstruct the quarter-panels, in addition to the front end, which had been damaged and poorly repaired many years ago. Larry also modified the firewall and toeboard to provide more legroom for Greg, as C1s are known for being a tight fit. After a few cycles of primer and block sanding, P.J. Burchett laid down the DuPont ChromaBase paint and covered it in G-2 clearcoat for a durable finish.

A black leather interior complements the black exterior, and the beautiful upholstery is the handiwork of Steve Holcomb at Pro Auto Custom Interiors. Custom bucket seats are wrapped in leather, as is the dash and the customized door panels. The dash is equipped with Classic Instruments gauges, and features a RetroSounds stereo system, along with controls for the Vintage Air system. Greg grips a Billet Specialties steering wheel and a Lokar shifter.

The point of building a car like this is to have the classic looks of an iconic 1950's sports car combined with the suspension and engine technology of the modern era. Sure, Greg could've gone with a newer suspension

> With an excellent power-to-weight ratio, grippy tires and plenty of creature comforts, this 1959 Corvette is light years ahead of its original capabilities, and it's ready for the open road.

or cranked up the horsepower in any number of ways, but the end result wouldn't have made him any happier. With an excellent power-to-weight ratio, grippy tires and plenty of creature comforts, this 1959 Corvette is light years ahead of its original capabilities, and it's ready for the open road—or maybe even a curvy road in the hills of Kentucky. **VETTE**

ARMS RACE

CORVETTES RUN HARD AT THE 2015 OPTIMA ULTIMATE STREET CAR INVITATIONAL

BY **STEVEN RUPP**

Back in 2008, the people at Optima Batteries had an idea to show that the cars typically seen at SEMA could actually go as fast as they looked. That first year about 30 cars showed up to battle it out in the desert at the K&N sponsored Optima Ultimate Street Car Invitational (OUSCI). Fast forward to 2015, and the event is on a whole other level. Over the last eight years the top-finishing cars have gone from modified street cars capable of track duty to pseudo race cars that are legal for street use. Participants have also figured out that it's a lot easier to make a modern car, like a C5 or C6 Corvette, fast than to start off with a vintage ride. This has resulted in a lot more high-tech muscle in the mix, making life even harder for the classic iron.

Last year the event was moved from its long-time home at Spring Mountain Motorsports Park in Pahrump, Nevada, to the Las Vegas Motor Speedway. The move allowed Optima Batteries to easily host the hundreds of spectators that were clamoring to watch the festivities, and the location was 50 miles closer to Las Vegas, where the annual SEMA Show is held.

Each year the rules are tweaked a bit, but for the most part this year's rules carried over from last year's OUSCI. The three driving events and the Lingenfelter sponsored Design and Engineering Challenge, were scored using a points system where points were awarded from 25 (first place) to 1 (last place). This meant the cars had to perform well in all four challenges to win the overall prize.

Another way to pick up points was in the road rally. This year it was a cruise down the Las Vegas strip, in near gridlock, where drivers could garner a maximum of 25 points. Blow getting these points and there's really no mathematical way you can do well in the overall event. After all, these are supposed to be street cars, so they should be able to drive around town, even in heavy traffic, without issue.

The Falken Tire Hot Lap Challenge consisted of three sessions where groups of cars were sent out on the 2.4-mile track. Cars were sent out in groups and passing was allowed on the straights. The first session ran in a random order, but subsequent sessions ran with the fastest "qualifying" car going out first. With over 80 cars the Hot Lap Challenge sucked up all of Sunday.

The Detroit Speed sponsored Street Challenge Autocross was also changed up quite a bit. Two cars were run at the same time (like a drag race) on two tracks that somewhat

One of the nicest looking Corvettes at the race was Greg Thurmond's freshly finished 1965 C2. We love seeing cars this nice getting driven hard.

First up Saturday morning was the driver's meeting held by FM3's Jimi Day. The schedule for the day was given out and all the safety rules were gone over.

After Danny Popp's big win last year, even more Corvettes showed up at the party with most consisting of C5s and C6s. None could top his C5 Z06, though, as he wound up taking the win for the second year in a row. His Z was fielding a new Lingenfelter de-stroked LS7 that sounded particularly pissed off on the track.

Todd Rumpke pulled off a 13th place finish in his worked over 2006 Z06. This was helped with a strong 8th place on the road course where his car is most at home. The three driving events are so different that it's really hard to have it set up to do well in all three.

Another Lingenfelter equipped Corvette was Tyrone Walker's 2006 Z06. He struggled to make it into the points, but he had a blast wheeling his Vette over the two-day event.

At 10 a.m., the first cars hit the track. On Saturday, the cars were divided by car number (odd and even) with one group going the autocross while the other hit the Speed-Stop Challenge. After lunch the two groups switched. Sunday was set aside exclusively for the road course Hot Lap Challenge.

OK, nothing makes you feel like a professional race car driver like having your own umbrella girl. It was cold and a bit windy, so the racers really appreciated their efforts to keep them shaded while waiting on the grid.

We've seen Chris Smith's LS-powered 1972 Stingray at events all over the country, so it wasn't surprising to see it at the big show. The C3 did well and placed 33rd overall. Considering the tough competition that's a pretty good accomplishment.

Rob Krider worked his 2006 Z06 hard all weekend and every time we saw him he was all smiles. Many of the drivers knew they didn't have a chance at the top spot, so they opted to do their best and have fun.

(Below) James Forbis, in his 2007, did well in all the events, especially the Hot Lap Challenge where he finished 5th. This consistency landed him in 14th overall.

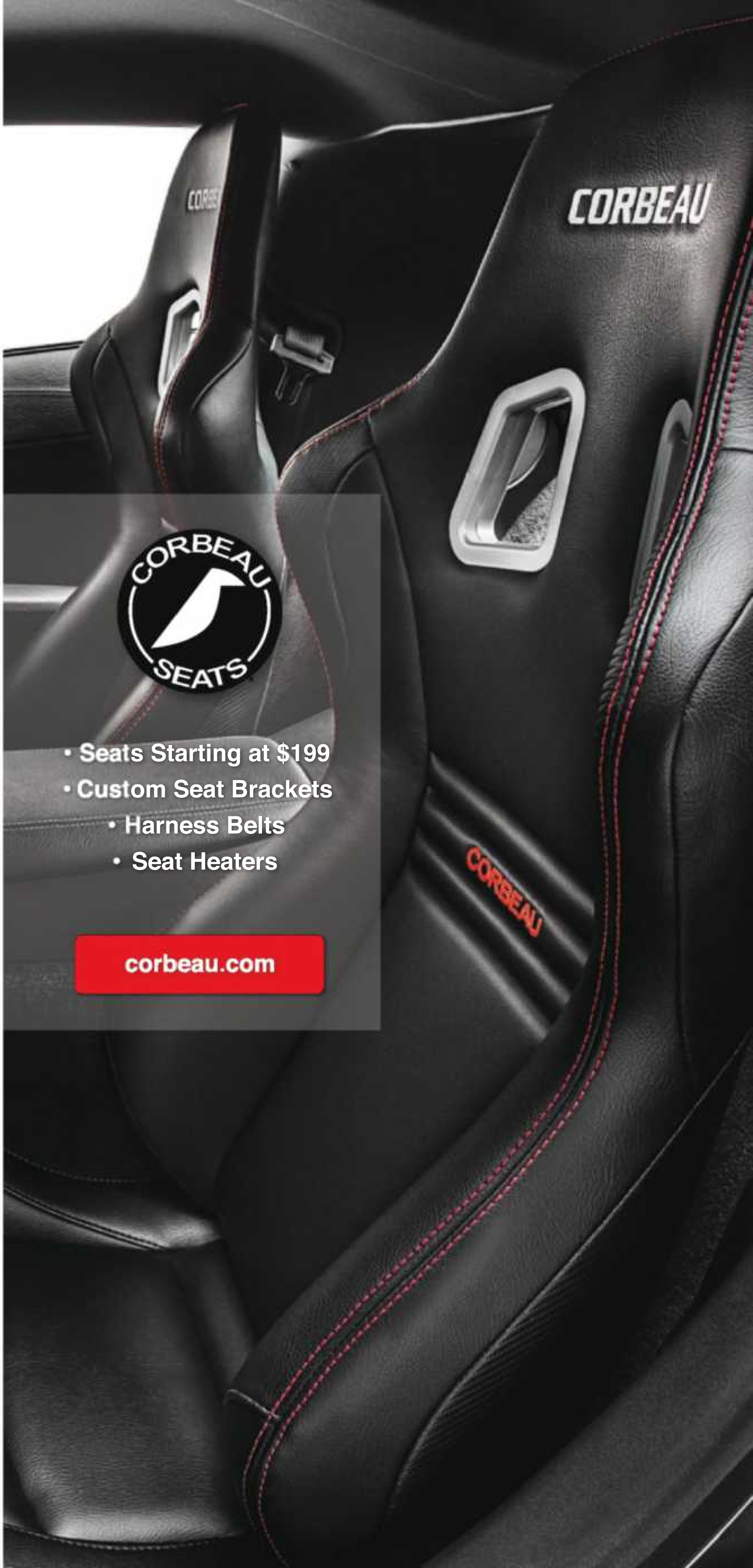
mirrored each other. This made it more fun for the fans even though the cars were racing the clock and not each other. Competitors had to make four laps on each track and then the top times from each track were added together. Hitting a cone, no matter how much it teased you, resulted in a 2-second penalty.

Lingenfelter sponsored the Design and Engineering Challenge where cars were judged much like they would be in a car show with an emphasis on modifications that are both aesthetic and functional. After all, this isn't about zip-tied and beat-up race cars, it's about finding the "ultimate" street car and that ride should be nice looking as well. This also penalized drivers that brought new, mostly stock, cars to the race.

In the Wilwood Brakes sponsored Speed-Stop Challenge, drivers combined launch speed with handling and braking prowess to launch into a banked 180-degree turn, negotiate a quick slalom, and stop in a coned off box. Bumping a cone in the stop box earned a DNF. It's way harder than it sounds and really favored cars with ABS systems and all-wheel-drive. For the non-ABS cars the real trick was to not flat-spot tires, which would make the road course tough since drivers run the same set of tires the whole event.

The competitor's best time in each event was used to determine how many points they accumulate. All the cars had to be displayed somewhere at SEMA and need a certain level of safety gear. The biggest rule was that the tires had to be 200, or greater, treadwear. Every entry had to pass a technical inspection where street car items like turn signals, wipers, back up lights, and such were confirmed.

Last year, several imports really put the pressure on the domestics. We may poke fun at imports, but an all-wheel-drive, raced-out Evo or GT-R is serious competition. This year there were even more worked-over imports on hand and they threw down some strong numbers, but, like last year, a Corvette fought hard and slid into the top spot. Mimicking last year, 11 of the top 20 cars were domestics and of the 11 American cars all but two were Chevys. The way things keep escalating we can only imagine what a battle next year will be. **VETTE**



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The only C7 at the event was Chris Neal's 2014 Stingray. We were a bit surprised no C7 Z06s were around, but most likely they didn't have time to earn a spot in the race given how new they are.

Another beautiful C2 was Jane Thurmond's 1964. One of eight women driving in this year's race, she had a blast flinging her Stingray through the events.

Rich Willhoff's 2006 Z06 may not look heavily modified, but it has the right parts in the right places. That, combined with a lot of skill behind the wheel, landed Willhoff in 5th place overall.

The other female Corvette driver was Stephanie Cemo in her 2009 ZR1.

Saturday night consisted of a 20-mile cruise through some of the more congested areas of Las Vegas. It's a great way to make sure the cars are streetable and the tourists along the strip loved seeing the cars.

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TREND SETTING—PART 15

A LOOK BACK AT CHEVROLET'S EXPERIMENTAL, PROTOTYPE, CONCEPT CAR, AND SHOW CAR CORVETTES

SCOTT TEETERS WORDS | ILLUSTRATIONS
PHOTOS COURTESY OF **GENERAL MOTORS**

General Motors makes hundreds of kinds of cars and trucks. Some sell hundreds of thousands of units a year, which makes Chevrolet's Corvette a complete enigma. Given the small number of Corvettes sold every year, it is a modern American manufacturing miracle that the car survived for 61 years.

The Corvette was "officially" born on January 17, 1953 at the GM Motorama Show at the Waldorf Astoria Hotel, in New York. To understand the impact of Harley Earl's two-seater sports car concept car, you have to look at typical cars of 1953. The car was low and sleek, and wasn't over festooned with styling gimmicks. Based on the response from attendees, Chevrolet rushed the car into production, and the rest is history.

Today, the Corvette is GM's flagship car. When Chevrolet unleashes a new Corvette, the automotive world stops to take notice. But things were not always this way. Up to the C4, there were many inside GM that wanted to see the Corvette go away. For the first 20-some years, the car suffered from an identity crisis. Inside GM there were always those that wanted the Corvette to be something different; a lightweight sports car, a mid-engine car, a rear-engine car, a four-seater personal luxury car, powered by a boxer-type flat-six, Wankel rotary-powered, turbocharged small-displacement hemi-headed double-overhead cam powered and even an all-aluminum car. Chevrolet kept the loyal faithful stoked with two or three experimental, prototype, show car Corvettes per year. From an enthusiast's perspective, this was endlessly fascinating.

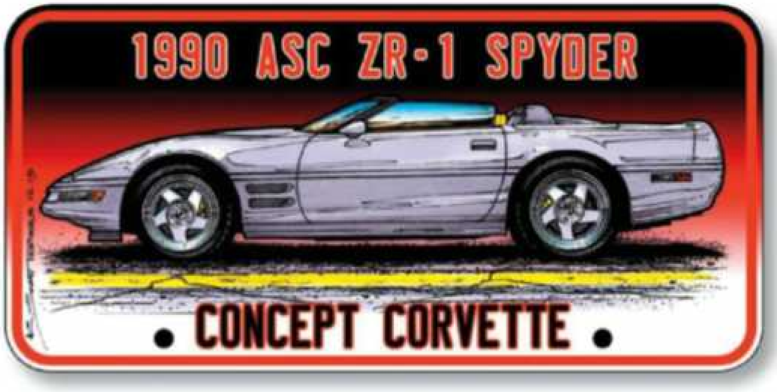
This is Part Fifteen of a chronological look back at Chevrolet's high-profile experimental, prototype, concept car, and show car Corvettes. This month we are continuing with the C4s, as the final two installments approach. The interesting thing about these three Corvettes is that the first was perhaps the closest of any to go into production, while the last two were some of the least likely. A more modest interpretation of the Spyder would have made a nice complement to the Corvette lineup on the more affordable base platform, and (not surprisingly) many of its features eventually did find their way on the later generation convertibles. Meanwhile, the 454 big-block–powered Big Doggie and the V-12 Falconer were a much more wild experiment that got some hearts racing, but with little feasibility or viability to make it into production. With the current trend moving towards smaller displacement engines, it is nice to be able to look back on these experimental Corvettes and wonder—or better yet, to inspire your own version.

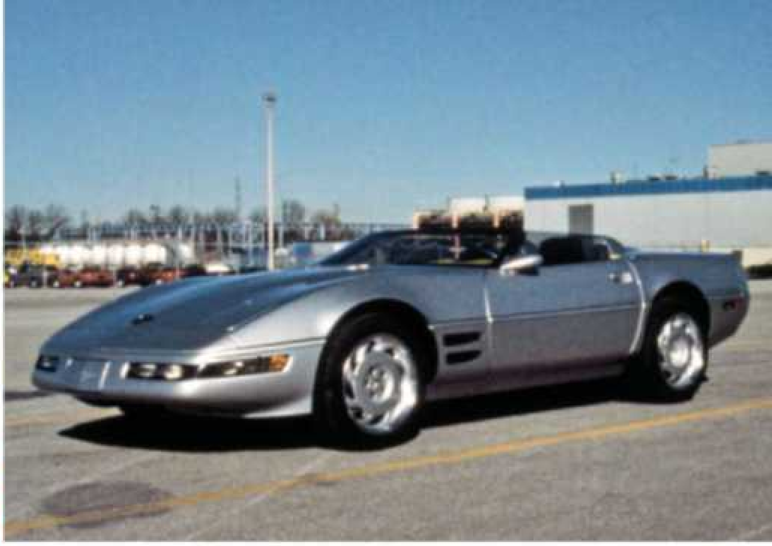
1990 ASC ZR-1 Spyder Show Car

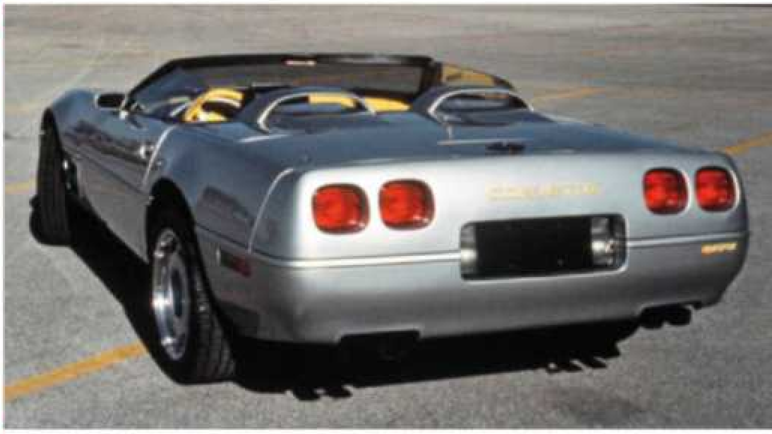
A cool concept, perhaps on the wrong model Corvette?

Corvette product planners spend a lot of time playing "What if?" But at least 80 percent or more of what they come up with never goes into production. By 1988-1989 it was no secret that Chevy was about to unleash the ZR-1 super-Vette, powered by an exotic, all-aluminum, double-overhead-cam engine with 130 hp more than the 245hp L98 standard Corvette engine. The car was so altered by the installation of the LT5 engine that the option price ballooned to $27,016 on top of the $31,979 base price, making the ZR-1—at the time—the most expensive Corvette ever offered.

So, it made perfect sense for the Corvette product planners to ask the question, "What else could we do with the







ZR-1?" The convertible was reintroduced into the line in 1986 with ASC (American Sunroof Corporation) winning the contract to build the convertibles in a new plant, three miles from the Bowling Green Corvette plant. ASC had been making sunroof, T-top and convertibles for all the major Detroit car companies since late 1963. So it wasn't a stretch when ASC submitted a concept sketch to the Corvette group, showing a speedster version of the upcoming ZR-1, they called "ZR-1 Spyder."

With help from Chevrolet, ASC built a killer concept car that in retrospect is a shame wasn't applied to the lesser expensive base convertible model. The ZR-1 was already Chevrolet's new hyper-expensive halo car, so a speedster version, regardless of how cool it was, would have cost even more than the almost $60,000 1990 ZR-1. "Cost reality" aside, let's take a look at what ASC came up with.

The engine, drivetrain, suspension and structure was stock ZR-1. While the concept art depicted a cut-down windscreen, similar to the 1963 Grand Sport Roadsters, practicality demanded that a real A-pillar and windshield frame be employed. Besides, the convertible top has to be able to latch onto something. The windshield was half the height of a stock Corvette convertible windshield. A waterfall trunk lid blended the rear deck down the middle of the seats (like a C1) and blended into the center console. Behind each headrest was a slight bump with a hoop that simulated a roll-bar enclosure. The front fender vents were two horizontal openings and the hood had small vents close to the base of the windshield. Wheels were custom billet five-spoke design, shod with wide ZR-1 tires, and the side mirrors were moved in closer to the car. The interior was trimmed in bright yellow leather on the seats, door panels, dash, and shifter boot. To keep the occupants from getting their heads hammered by the wind, the seats were lowered by mounting them directly to the floorboard. Painted bright silver, the yellow interior/silver exterior was a, "love it, or hate it" kind of thing. The fold-up convertible top was reminiscent of the Porsche 356 Speedster.

It was a very cool-looking concept car. Advanced Engineering Chief Don Runkle liked the car so much he had ASC build six Spyders for evaluation, but without the chopped top. The first Spyder made its debut on January 12, 1991, and sported a unique VIN number that started with "DK" for Don Runkle. The privileged few that got to drive the car reported that the car had minimal cowl shake and was very pleasant to drive. At one point the Spyder was fitted with a removable hardtop. Corvettes are already low cars, so with the lowered seats and a fixed roof, the closed up Spyder must have been "tight."

Often with concept cars, designers aim extra high, knowing that the design will have to be pulled in. ASC built a more realistic version using a stock LT1 convertible that used the waterfall trunk lid with the bumps behind the headrests. It's too bad the design wasn't integrated into the C4 convertible. But this did not go unnoticed by C5 stylists, as that is exactly what's been used for the C5, C6 and C7 convertibles, including the bumps.

The Spyder worked the show car circuit for a few years before returning to Bowling Green for a paint and interior makeover. The exterior was painted Sapphire Black and the interior trimmed in Torch Red leather. The original was "bright and happy-looking," the refreshed version was "sinister and hot." In 2006, General Motors loaned the car to the National Corvette Museum where thousands of fans enjoyed the car until that fateful morning of February 12, 2014, when of all places to be in the world, the ZR-1 Spyder was sitting above a sinkhole that opened up and consumed eight unique Corvettes. Of the eight cars that went into the hole, only three were able to be restored; the ZR-1 Spyder was too far gone. The five cars that were deemed beyond repair are now part of the museum's permanent display.

1991 ZR-2 454 Big-Block, “Big Doggie” Experimental Corvette

The Return of the Big-Block? Not a Chance!

There must have been something in the office water cooler in the late ’80s that inspired engineers to want to put seriously big engines back into Corvettes. Scott Leon was a project coordinator at the GM Proving Ground in Arizona. And although the Corvette was being hailed as “The Best Vette Yet!,” hammering the competition in the SCCA Showroom Stock series, and had won several magazine new car top speed competitions and was crowned “The Fastest Car In America!,” there were some that longed for the days of big-block horsepower and torque. So, Scott Leon cooked up a plan.

One night after work, Leon and his crew decided to see if a big-block engine would fit between the framerails of a C4 Corvette. Using an old ’84 mule car, the crew was surprised to find that the big Rat fit into the frame with only a few minor chassis modifications. It was definitely a squeeze, but it fit. Since new Corvettes now used electronic fuel injection, Scott wanted the big-block to be “modern,” so they cobbled together a tuned-port fuel-injection unit with a modified aftermarket tunnel-ram manifold. After a little welding and a set of Buick Grand National fuel injectors, the rigged system worked.

This crude engineering study was enough for Leon to get management to agree to build a 454 prototype using an ’86 coupe with an automatic transmission. Later, another prototype was built, this time using an ’89 roadster with the Z51 performance suspension, and a six-speed manual transmission. Things were beginning to get interesting because the big-block C4 could deliver ZR-1 performance at a fraction of the cost! Consideration was seriously given to the possibility of offering a Chevrolet-designed, big-block engine swap kit, available through the Chevrolet Performance Parts catalog.

The final version of the ZR-2, aka “Big Doggie,” was very impressive. Scott Leon chose to use one of Chevy’s marine 454 short-block engines and added a set of L88 aluminum heads. The ZR-2 had become a feasibility study, so the engine assembly was modified so that all production accessories would easily bolt on. The only modifications to the car were to the floorpan and the right side of the framerail, forward of the firewall. Aside from the slightly raised hood dome, the completed car looked like a production Corvette.

Big Doggie’s fuel-injected, L88 aluminum headed 454 was never dyno tested, but engineers estimated the power around 385 hp (net), on par with the ZR-1’s new LT5 engine, but with a big difference—torque, that “other” horsepower. The 454 big-block had much more low-end torque (big-block fans rejoice!) than the ZR-1’s LT5. The privileged few automotive journalists that got to drive the car confirmed the development engineers’ experience, reporting that the big-block C4 pulled like a freight train. To save weight and slightly stiffen up the structure, Scott Leon had the convertible top mechanism removed and the hardtop bolted into place. And with the Z51 suspension and six-speed manual transmission, the car was a hoot to drive.

While not nearly as extreme as the V-12 Falconer, Big Doggie’s chances of making it into production were zero. Since Chevrolet had not only bought Lotus to be used as an engineering and development satellite, and had so much invested in the ZR-1/LT5 program, there was no way management was going to let a big-block option back into the Corvette lineup. And getting a big-block to pass emissions and fuel mileage requirements were beyond doable. The engine swap kit didn’t even make it into the Chevrolet Performance Parts book. No, ZR-1 performance at a fraction of the cost wasn’t what GM was interested in.

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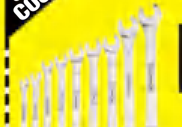

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1992 Falconer All-Aluminum V-12 Experimental ZR-12 Corvette

Can you say "Overkill," anyone?

When the Dodge Viper debuted at the North American International Auto Show in January 1989, NO ONE knew what hit them! The Viper was new and fresh, yet the connection to the Shelby Cobra was obvious. Advanced orders were flooding in! You just know that the Corvette designers were going back to the office saying, "DAMN!"

The Corvette team was already working on three fronts: improving the production Corvette, getting the ZR-1 and the LT5 engine ready for production, and honing the CERV III prototype as a possible C5 Corvette. But the economy wasn't good and the reality of a CERV III-based car seemed dim at best. Meanwhile, Chrysler was going into production with the V-10–powered Viper. This posed a serious threat to the Corvette's "America's Only True Sports Car" status. Under the guise of a "chassis development" program, the Corvette team came up with the idea of trumping the V-10 Viper with a V-12 Corvette prototype, nicknamed Conan the Corvette. Enter Ryan Falconer.

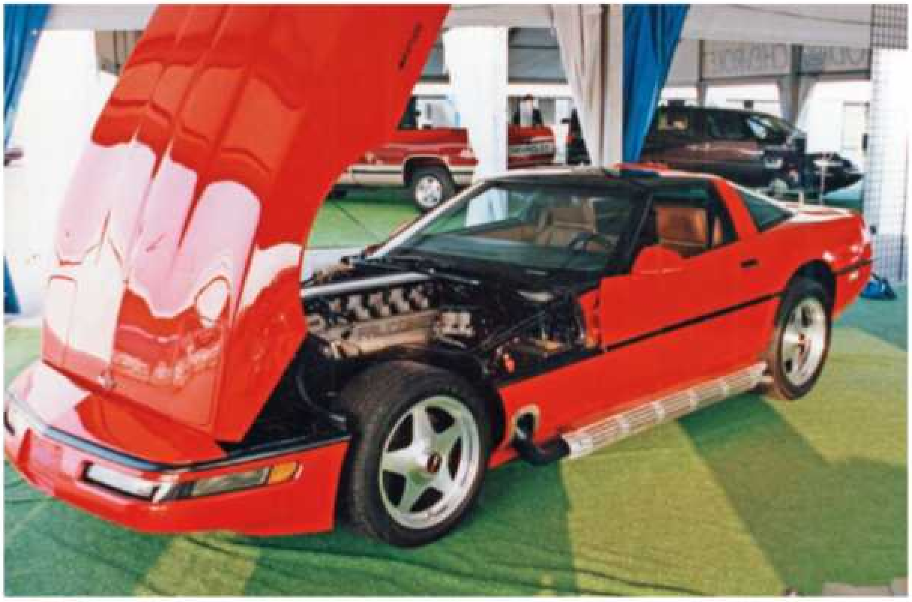
Falconer got his start in the early '60s working for Andy Granatelli on Andy's Novi engine-powered Indy racers. The last Novi engine that Granatelli used had just 167 cubic inches, was supercharged and made 837 hp! Later, Ryan joined the Shelby American team and worked on the GT40 and racing Cobras. Two years later in 1966, Ryan started his own company, building his own racing engines. Falconer's associates list reads like a who's who of auto racing legends, including Parnelli Jones, Al Unser, Mario Andretti, Jackie Stewart, and many others.

So when the Corvette team decided to one-up the Viper with four extra cylinders, they decided on one of Ryan Falconer's stunning, all-aluminum, 600-cubic-inch, 683hp, 680 lb-ft V-12 racing engines. Similar Falconer engines usually saw duty in marine applications and as a reliable engine for P-51 fighter plane replicas. The engine is actually a variant of the traditional Chevy small-block, with four more pistons on each side. So, we could consider the V-12 Falconer engine as a "second cousin, once removed" from the small-block Chevy family. Since the Corvette would have to be stretched, this was the perfect time for a "chassis study."

Remember, in 1989, the production L98 Corvette had 245 hp and the ZR-1's LT5 was rated at 375 hp. Since the Falconer V-12 was a horsepower and torque monster, the obvious platform to use was a production ZR-1 because the entire drivetrain of the ZR-1 had been beefed up for the more powerful LT5 engine. The biggest challenge was the fact that the all-aluminum V-12 engine was 8.8-inches longer than the production Corvette engine. So the front end of the ZR-1 would have to be stretched 8 inches. SportsFab of Wixom, Michigan, was contracted to stretch the front end. The extra length is barely noticeable, but the '60s-styled side-pipe covers and big black exhaust collector poking through the front fenders sure were. Those were straight-through pipes, directly off the tuned headers, with no mufflers! With the hood up, the engine looked enormous. The all-aluminum V-12 weighed 523 pounds, about the same as an iron small-block Chevy. Amazingly, the extra length and the larger engine only added 100 pounds to the overall weight of the car. By comparison, the stock L98 was using a cast-iron block and aluminum heads. The Falconer V-12 used electronic fuel injection with a short-runner intake manifold and the aluminum block had pressed-in cast-iron sleeves, similar to the infamous big-block 427 ZL1. When automotive journalist Don Sherman reviewed the car in the May 1992 issue of *Motor Trend,* he described the Falconer's unmuffled exhaust tone as "Satan's own serenade" and said that the engine's idle was "capable of intimidating anything short of a Pro Stocker."

When Sherman spent time with Chevrolet drivetrain engineer Jim Minneker and the ZR-12, the car fried the big ZR-1 rear tires for half the quarter-mile test track. Actual performance figures were never published, as the big ZR-12 was having overheating issues. Besides, this was just a "chassis study." Using the published weight of a ZR-1 at 3,465, plus an additional 100 pounds for the honk'n V-12, puts the power-to-weight ratio at 5.19:1! What was certain was that at $45,000 per engine (1990 dollars), plus the chassis and body modifications, this car didn't stand a snowball's chance of ever getting into production. It is ironic how what was once a fantasy, "a 683hp Corvette," is today so easily attainable, and then some.

Nicknamed Conan because of the huge V-12 engine, the ZR-12 was without a doubt one of the baddest engineering study Corvettes ever made. Almost a throwback to the 1960s when the attitude in Corvette R&D was, "Let's try it!" **VETTE**



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2015 DAYTONA TURKEY RUN

CORVETTES FLOCK TO DAYTONA INTERNATIONAL SPEEDWAY ON THANKSGIVING WEEKEND

TEXT & PHOTOGRAPHY **JOE GREEVES**

An estimated 5,000 vehicles were on display at the 2015 Daytona Turkey Run, inside the Daytona International Speedway.

If you're an automotive enthusiast and have spent some time in the Southeast, you'll probably know all about the annual Daytona Turkey Run. On the other hand, even if you live in sunny California, you might also be familiar with this legendary event. A four-day gathering held over the Thanksgiving weekend, the event is now in its 42nd year. While there are lots of superlatives associated with the Turkey Run, the sheer numbers might tell the story best. This year an estimated 150,000 spectators enjoyed the display of more than 5,000 vehicles lined up on the infield at the Daytona International Speedway. While it is not a Corvette-only event, you will typically see more of our favorite car at this show than you will at a dozen Corvette-only events. But there's more.

This is one of those events where you'll need comfortable shoes since there is so much to see and do. You can easily spend a day checking out the collection of show vehicles on the eastern portion of the track and another day sorting through the more than 3,000 vendors on the western side. The custom rides will give you new ideas for your own and the vendors will provide the parts. In between, the car corral had more than 1,500 vehicles for sale, making it one of the coolest weekend custom car lots in the state. Grab a bite to eat at one of the dozens of food vendors throughout the track, then make your way toward the registration tent for the Friday, Saturday and Sunday afternoon door prize giveaways. Significant items went home with new owners! (Fun part: the host club, the Daytona Beach Street Rods staff throws out 10 small rubber turkeys throughout the giveaway. Return them to the stand and collect $50.) Beginning on Thursday and extending through Sunday, watch the professional restoration team from CMMC Garage work around the clock to build a complete '55 Chevy Bel Air during the show. Walk through Artisan Alley and see the collection of special art, fashion and more gifts for sale. Did you take a kid to the car show? The Little Gobbler's Zone, bounce houses,

obstacle courses and more kept them busy. Take a chance on the Raffle Car, this year a "Really Red" '73 Nova SS, complete with a 350/350 powertrain. Proceeds from the annual raffle allow the Daytona Beach Street Rods host club to continue their charitable work in the local community, with more than $8 million returned through grants and sponsorships over the years. Learn more about this legendary Florida show at www.daytonabeachcarshows.com. VETTE

More than 3,000 vendor spaces had everything you needed for that restoration project back home.

Food vendors were everywhere, with some including a delightful automotive flavor as well.

Corvette clubs from around the Southeast lined up throughout the show.

Scooters were very popular at the event, allowing you to more easily cover the sprawling collection of vehicles and vendors.

Custom touches and cool paintjobs were everywhere.

The Car Corral had lots to choose from, like this 1994 convertible complete with air ride and Lamborghini-style doors, priced at $15,000.

This Pro Street '64 Corvette, complete with rollbar, was part of the Time Bandits car club.

Thousands of dollars worth of giveaway prizes went home with new owners during the Friday, Saturday and Sunday afternoon giveaways.

Many manufacturers recognized the drawing power of a custom Corvette in front of their booth.

You never quite know what you'll find in the Car Corral, like this Corvette mixing a combination of old and new.

There were several opportunities to buy, like this 1975 Corvette distress sale due to a death in the family, $15,000 or best offer.

When was the last time you saw a C1 Corvette gasser, complete with blower, dual carbs and traditional stance?

Lots of ultra cool Corvettes were on hand like this Stingray, featuring a beautiful blend of custom touches and big horsepower.

This Anniversary Corvette had a price tag of $9,500 or best offer.

Yes, we know it's not a Corvette but the "Really Red" '73 Nova SS would still look good in your garage. Carlos Diaz from Sanford, Florida, was the lucky winner.

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EVERYTHING YOU NEED TO KNOW ABOUT AFTERMARKET HEADERS & EXHAUST

POWER-PRODUCING PIPES FOR YOUR PLASTIC FANTASTIC

BY **RICK JENSEN**

If you were lucky enough to grow up around car enthusiasts, you've probably heard your dad, uncle, or brother say, "Nothing wakes up a V-8 like a good set of headers." And that's true—few Corvette modifications are as rewarding as installing a good set of pipes.

And of course, second only to your header-buying excitement is your friends'/forum buddies' excitement for you, as they now get to "advise" you about the "best" headers for your Corvette. Ah, if I had a nickel for every time I've heard, "1-3/4s are perfect for your engine." (It's a 283.) Not to knock that rare forum guru, or your SBC-wizard buddy—60 percent of the time, they're right every time. No, picking the perfect set of headers/performance manifolds is something that *you* should do. And all it takes is for you to determine your goals, compile good intel from trusted sources, research your options and pick your pipes. And what the hell, for this month we'll try to fill that "good intel" requirement for you.

Let's start with the most visible header feature, its primary size. Choosing the primary size isn't always about picking the largest option—your engine is a precise combination of air-pushing parts, and adding appropriately sized pipes is the only way to add power *and* keep drivability.

But remember that a header's primary length, collector type, secondary length and secondary diameter is important, too. Because when all of those factors work together, they create a "tuned system" that does more than evacuate exhaust. It also creates pressure waves that scavenge any remaining exhaust from the cylinder. So a tuned header system "sucks" the intake charge into the cylinder before the induction stroke even starts, and does so over a wide rpm range. That, my friends, is an efficient and power-producing header system. And the best part is, today's headers and performance manifolds benefit from extensive testing—which maximizes the power and torque gain for your hard-earned money.

Header fitment is another crucial factor. Power potential's great, but the thing about headers is, you've gotta live with them every day. Theoretically speaking, let's say that the

MANIFOLDS

Lord Our God created the perfect set of headers, then passed 'em down to you, Ten Commandments-style. Installed on your Vette they add 300 horses, they trumpet forth a mighty roar, they make all the inhabitants of the local Sonic tremble. And you rejoice! But when you realize that they leak, hit your frame and steering rack and don't give much clearance for your angle-plug heads … well, you'd probably grit your teeth and deal with the clunks for a month to be polite, then sell 'em on eBay. *(Our Lord would surely design The Chosen Headers to clear everything; the heathen is just giving an example-Ed.)* In short, your goal should be to find headers that are just as NVH- and leak-free as your stock manifolds.

Finally, there are lots of little details that need to be considered: how's the material quality and finish? Will they connect to a stock exhaust system? Does it use a crossover? Are heat risers and tubes/cats and O2 harnesses used? Is the included installation hardware high quality and complete? And do performance manifolds really fit just like the factory ones do?

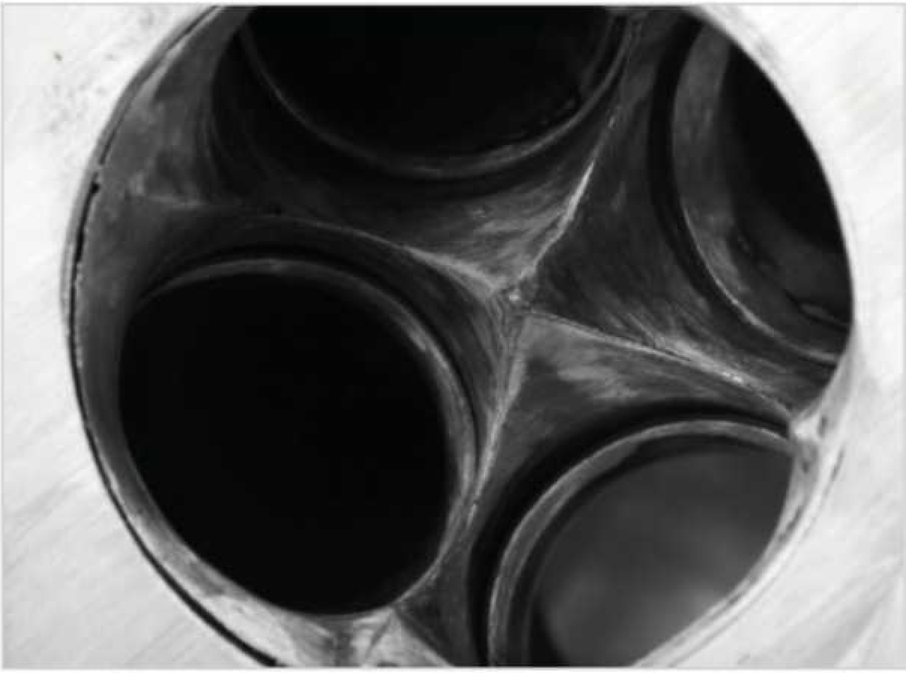
It's a lot to think about, so get started by reading the below Header Dimensions and Header Features sections. They'll fill in some blanks, so you can make your choice from the online buyer's guide. Don't worry, we'll keep it short and sweet so you don't get too … exhausted? *(Blasphemy and bad puns? Lord, smite away.-Ed)*

Header Dimensions

Headers are often referred to by their overall length—and typically, the longer they are, the better they perform. A Corvette with **stock manifolds** can add **ported manifolds**, **shorty headers**, **mid-length headers** and **full-length (aka long-tube) headers**. And of course, Corvette headers can be had in **rear-exit** form, as well as **side-exit** configuration for factory side-mount cars. So here are the header dimensions that you need to know:

Primary size refers to the inner diameter of each header tube. In the Chevy V-8 realm, common sizes include 1-1/2, 1-5/8, 1-3/4, 1-7/8, and 2 inches. Just like everything else in hot rodding, primaries must be sized correctly for your engine to make power, while still giving good drivability. For the best performance, you'll need to find out your engine's cylinder head exhaust flow numbers at peak valve lift, then choose the right tube size from the chart below.

Most headers have **constant** primary sizes, meaning they use the same tube diameter throughout. However, some offer the option of **stepped** primary sizes—for instance, starting at 1-3/4 then going up to 1-7/8 further down the tube. This is said to help scavenging and add a little power, especially on heavily modded race engines. But for the majority of street Vettes with stock or mildly modded engines, it's a more-expensive design that adds little, if any, power.



STREET CORVETTE PRIMARY SIZE RANGES
1-1/2-inch primaries for 170 cfm or less exhaust flow
1-5/8-inch primaries for 180-200 cfm exhaust flow
1-3/4-inch primaries for 210-240 cfm exhaust flow
1-7/8-inch primaries for 250-275 cfm exhaust flow
2-inch primaries for 280 cfm or more exhaust flow
*Street/strip Corvettes may benefit from a one-step larger primary size, but staying with the street recommendation size won't hurt flow that much and will be more responsive on the street.
*Race-only Corvettes with around 160-cfm-and-up exhaust flow should start with the street recommendation primary size above, then go one primary size larger: 1-1/2 to 1-5/8 inch, 1-5/8 to 1-3/4 inch, 1-3/4 to 1-7/8 inch, or 1-7/8 to 2 inch.

Primary length is the full distance of the primary tube, from the flange to the collector. This distance isn't the most critical header dimension in a Detroit V-8 powerwise, as our two-plane domestic crankshafts create unevenly spaced (and beneficial) firing pulses at the collector. And while a too-short primary length can really drop torque output, in general, mid-length or long primaries produce good low- and mid-range torque and power, perfect for street-driven Corvettes.

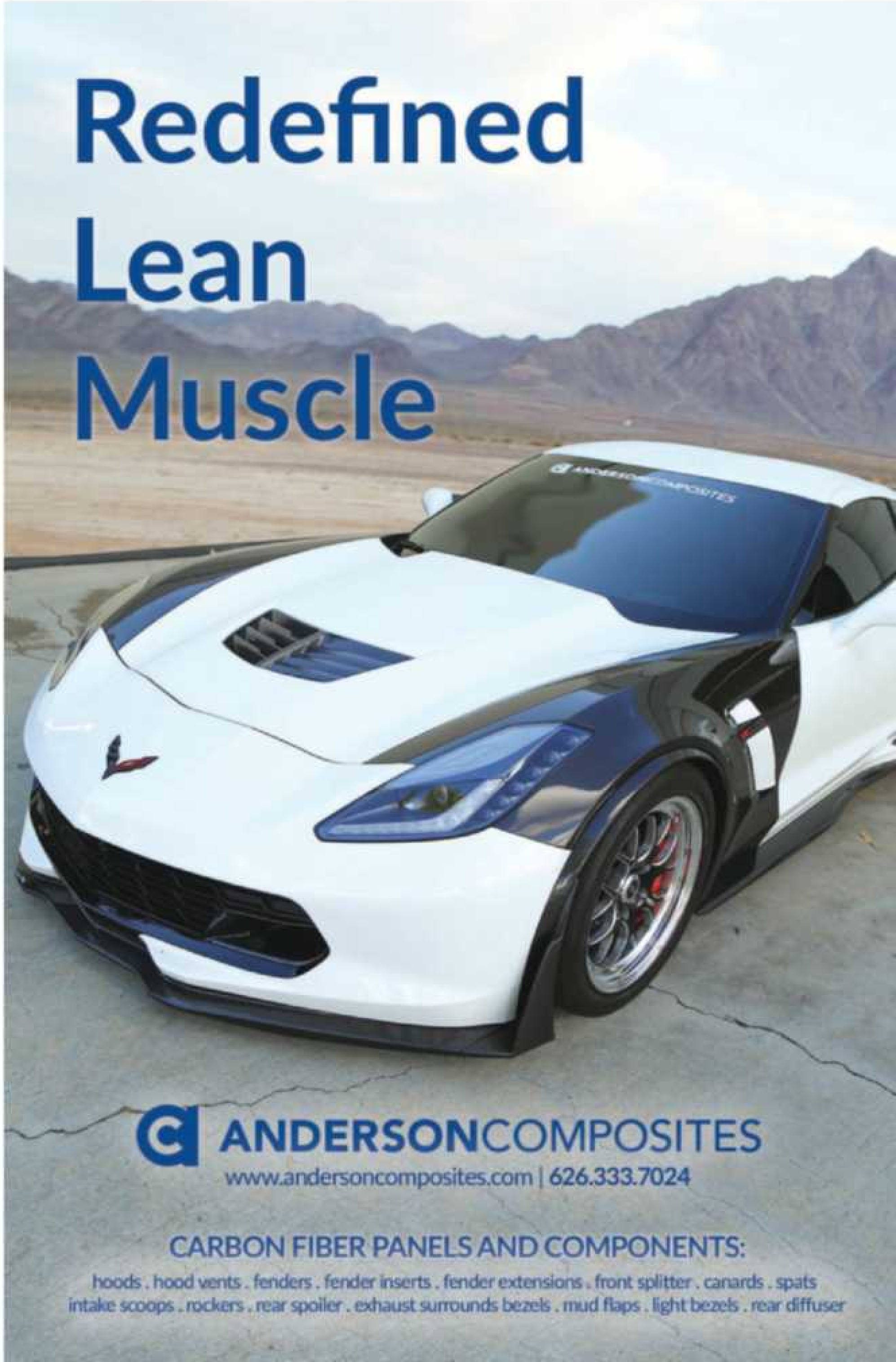
Secondary length is how long the secondary pipe is. Like many things in life, a stubby pipe isn't good; a longer secondary length is very important for power and torque production, and really adds torque under the curve, too.

Finally, the **secondary diameter** is, uh … the diameter of the secondary pipe. From a sizing standpoint, taking your headers' primary diameter, multiplying it by 1.8, then rounding to the closest number, gives an adequate secondary diameter measurement. Chevy V-8 headers typically use a 2-1/2- to 3-inch secondary diameter.

Header Features

The **material** used depends on whether you're bolting up headers or performance manifolds. **Headers use steel** in varying grades, including mild steel, 409 stainless, 304 stainless, and 321 stainless. 409 stainless is high quality, but not as rust-resistant as 304 stainless. And 321 stainless is high-end, very high-temp steel that's typically used in turbocharged applications.

Good-old **cast-iron manifolds** are still as beefy as your mother-in-law's butt, no getting around that. But a few companies do precision porting and flange work, which creates manifolds that look stock, seal up nice and tight—and flow enough to greatly improve your stock-look power numbers.



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Tubing thickness is how thick the walls of your headers are. This can vary from the standard sizes like 18- or 16-gauge, to thicker sizes like 14- and 12-gauge tubing in higher-end headers. The thicker the tubing, the higher the quality—and there's definitely some garbage out there. So pay to do it right the first time, which can prevent additional spending in the long run after cheap eBay tubes crack on you.

Flange thickness matters because header flanges must stay straight to seal up. And thin header flanges can warp; blowing gaskets and causing noisy exhaust leaks. Header flanges can be found in 1/4-inch, 5/16-inch and beefy 3/8-inch sizes. Again, the thicker, the better.

If your late-model Vette's emissions equipment must stay intact, you can attack the problem a couple of ways: **states with less intrusive emissions testing only** require good idle quality and no SES light, so you can run **long-tube headers with emissions connections like air/EGR, and high-flow metallic substrate cats with extended O2 sensor harnesses**. Get retuned to keep idle quality good and the SES light off, and you're golden.

However, **in ultra-strict testing states like California, your best bet is to install shorty headers with an E.O. number**. Some shops will overlook long-tubes during the visual test, but some will ask for E.O. numbers for a cold-air intake. Legally speaking, long-tubes don't look stock, and they take longer to get cat temps up during cold starts. We hate to say it, but in the Republic of California, long-tubes are very likely to give you a hellish Groundhog Day of repeatedly paying a testing shop that'll ultimately fail you.

A header's **exhaust port shape** can be **round or D-shaped**, and should match the shape of your cylinder head's exhaust ports. Header exhaust ports can be slightly larger than the head's exhaust port, leaving extra room for head porting.

The **collector design** is simply how the primary tubes merge into the larger secondary pipe. Aside from high-end "four into two into one" (aka Tri-Y) race designs that usually won't fit in a street car, **aftermarket headers typically use two types of collector designs: the parallel type and the merge type**.

A **parallel collector** is a design where four tubes simply merge into one large secondary pipe. This design is simple, time tested and effective. And a **merge collector** also turns four tubes into one, but the tubes enter a venturi-shaped area first, then expand into the secondary pipe. Building merge-collector headers takes more work, so they're often more expensive, but this design typically makes more power and torque across a wider rpm range compared to the parallel design.

A **scavenger spike (or merge spike)** is a metal spike that can be found inside a header's collector. It has two purposes: smooth out turbulence in the exhaust flow as it transitions from the primaries into the collector and to promote better exhaust scavenging. Done right, both help create more power—as well as a smoother, purer exhaust sound.

Balance pipes like X-pipes and H-pipes are found downstream of the collector. They balance, or equalize, the exhaust flow from all of the cylinders by connecting the left and right exhaust banks, which helps reduce backpressure and increase scavenging. This also adds power, with an X-pipe making a few more ponies than an H-pipe will. They also sound different: an X-pipe is known for its high-pitched, exotic sound, while an H-pipe has a deeper, muscular rumble.

Finishes or coatings are any product used to cover bare-steel (or natural) headers. Header coatings can include regular paint (which only protects against rust until you start the engine), and also **high-temp paint, ceramic, and chrome**. For longevity's sake, your best course of action is to choose one of the latter: either have the manufacturer high-temp paint/ceramic-coat/chrome-coat them, or have them coated by a reputable coater before you install them. Ceramic coating not only prevents rust, it also lowers underhood temps.

Header Details

Straight- or angled-plug head compatibility is a big detail that you can't afford to get wrong. Factory Chevy heads feature a straight spark plug design—the plugs come straight out, perpendicular to the head—which offers better plug/spark plug wire clearance with headers. But **some over-the-counter GM heads and many aftermarket heads use angled plugs**, where the plugs sit at an angle. This is done for better combustion and slightly better performance; however, they make plug/plug boot clearance much tighter, and are more expensive to "boot." As headers exist for both straight- and angle-plug heads, the choice is yours—just be sure you order the right kind of headers for your head type.

Engine bay clearance is another big concern. There are several engine components that you must verify before you order headers, as a certain header application can be made in multiple versions to fit various year/make/model Corvettes, in both stock and modified forms. **This can include steering racks, A/C brackets and starter and oil filter locations.** Yet, depending on those variables and your choice of header, you still might need to have a primary tube lightly dimpled or a bracket changed (or lightly trimmed) for a perfect fit. If you've seen some engine bays these days, you'll understand why that's not a big deal.

If you've done your research, **chassis and exhaust system clearance issues** should rarely come into play. But if they do, you'll have to balance your lust for powerful pipes with the downside of **possibly notching a classic Corvette's frame or tweaking its exhaust system**. We'll leave that tough call to you. And again, the more you research and deal with reputable, quality header companies, the fewer major issues you'll run into.

Most headers/manifolds include **hardware** like **bolts/studs, gaskets and even reducers/muffler inserts**. But some kits include premium hardware with stainless band clamps and Grade 8 nuts and bolts. If it comes with low-grade stuff, consider using good clamps and hardware, as you only want to do this install once.

And while some have no coverage, most headers come with a **warranty between 90 days and limited lifetime for the original buyer**. And remember, if you bend, grind, cut or mangle your pipes during an attempted install, you're gonna be S.O.L. So, you know, be careful.

Two final things: one, **don't use ceramic-coated headers to break in a new engine**, as the assembly lube can damage the ceramic coating. Use cheapo headers for break-in, then switch to your coated headers afterwards.

And two, **don't use header wraps**; try to buy headers with a high-heat coating instead. Wrapped headers can retain moisture, which will accelerate rusting and possibly cause cracking. **VETTE**

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FORGET FORCED INDUCTION

LINGENFELTER'S 550HP LT1 HEAD/CAM PACKAGE IS A BLOWER ALTERNATIVE

BY **BARRY KLUCZYK**

When it comes to aftermarket performance enhancements and tuning, the C7 Corvette's LT1 has proved itself a tough nut to crack. Although it is based on the familiar LS architecture, the combustion system is completely different and is designed to support the direct injection fuel system, while technologies including GM's Active Fuel Management (cylinder deactivation) and camshaft phasing (variable valve timing) throw additional curves. Finally, the E92 engine controller is completely different than the ones used with LS engines.

"Taken all together, there is a lot to wrap your arms around with the new LT engines," says Mike Copeland, Lingenfelter Performance Engineering's vice president of operations. "It's still a familiar cam-in-block V-8, but the technologies employed to optimize performance and efficiency in production form mean the traditional methods of increasing horsepower require different approaches to generate a result that doesn't sacrifice drivability or overall performance for a comparatively minor maximum power gain."

Take the combustion system for example, rooted in the cylinder heads. The combustion chambers are shaped very carefully to work with the unique topography of the pistons, which are designed to direct the fuel's spray pattern throughout the chamber for an optimal, more complete burn. That's because the fuel itself is introduced in the combustion chamber, rather than being sprayed into the intake manifold and delivered with the air charge as a homogenous mixture. It's the essence of direct injection and it means conventional head-porting tricks aren't necessarily beneficial.

"Because you're mixing fuel with air for the first time in the combustion chamber, you don't necessarily want to simply hog out the heads' intake ports," says Copeland. "That doesn't give you the benefit you want and, in fact, it will likely cost you horsepower."

The same goes for the camshaft, thanks to the cam phasing system. Because it alters valve actuation across the rpm band, applying traditional increases in lift and duration can easily wind up sacrificing low-end power to achieve an overall power gain that comes only at high rpm.

"It's all too easy to go backward with LT power," says Copeland. "It's clear the GM engineers did their homework. The factory LT1 heads and camshaft work very well and taking them to the next level requires an extremely balanced approach."

Lingenfelter has apparently found the sweet spot, as its heads-and-cam-based performance package takes output from the stock 455 horses to 550 horsepower—all while retaining excellent drivability and features such as the factory cylinder deactivation system and the full range of camshaft phasing. They've even got more radical cam packages that are rated at 600 and 630 horsepower, respectively, but they eliminate the cylinder deactivation and variable valve timing systems.

We were intrigued with the 550hp package mostly because it offered a maximum power rating that approaches the previous generation bolt-on supercharger system, but with natural aspiration and the retention of the factory technologies. Believe us, we love blowers—and so does Lingenfelter, which offers Edelbrock and Magnuson-based systems—but for those of us who like to run their Stingray on a road course for track days, there are a couple of big advantages to running without forced induction. For one thing, there's no heat soak to contend with after a couple of laps. Secondly, blowers and their related plumbing and heat exchangers, add weight, perhaps 90 pounds overall, and most of it is located smack-dab over the front wheels.

Where the supercharger offers an advantage is more-immediate power delivery lower in the rpm range, so if you're looking for that instant hit on the street or dragstrip, the blower may be the answer you're seeking. But if you enjoy the satisfying sound and feel of high-winding horsepower, natural aspiration is your brand of yoga.

At Lingenfelter's Decatur, Indiana, facility, we watched the upgrade of a stock Stingray to the head-and-cam package. It's technically feasible to do it with the engine in the car, but with the space and tools, it's ultimately easier to pull the engine out and that's just what the technicians did. The bottom line for the upgrades, which included the removal of the engine, the installation of the new heads and cam, reassembly of the engine, installation back in the car and, finally, dyno tuning, was $9,395.

No, that's not chump change, but it's less expensive than having a supercharger system purchased, installed, and professionally tuned, while delivering a solid 95-horsepower increase over the stock power rating. Value, it is said, is in the eye of the beholder.

Our experience with the Lingenfelter-ized Stingray proved fun and rewarding. There's nothing like the tingle in the spine generated by the sound of a 7,000+rpm Chevy V-8 as it screams up the tachometer. In this instance, you can forget the forced induction. **VETTE**

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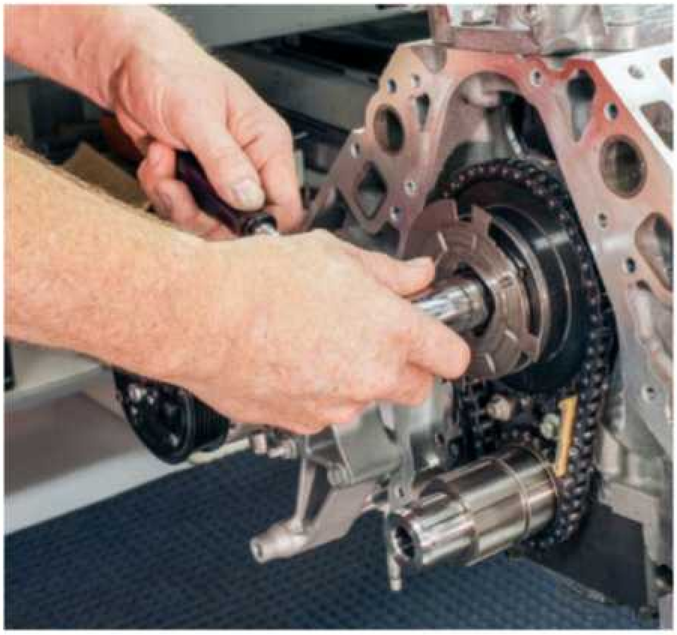
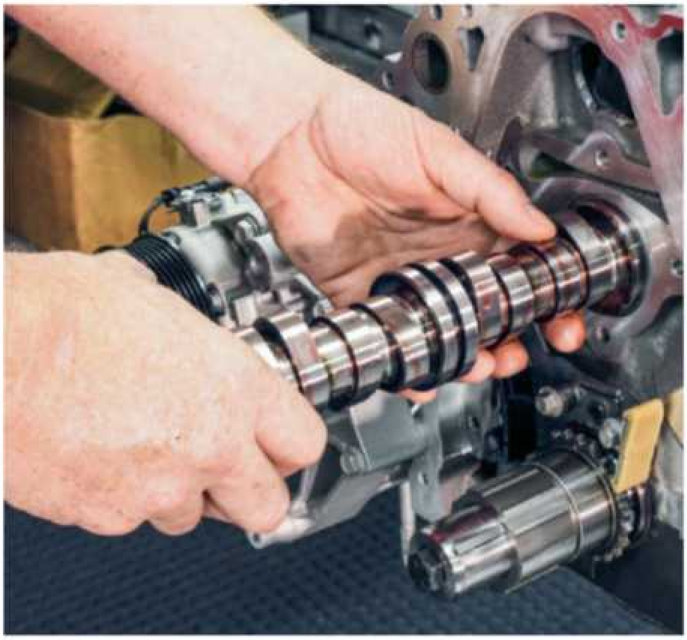
01 **With its standard 455 horsepower and 460 lb-ft of torque, the Gen V LT1 is the most powerful standard Corvette engine ever. Its performance is due largely to a direct injection-based combustion system that upends many of the traditional methods of increasing performance. At least, it makes them more difficult.**

02 **The first step in Lingenfelter's LT1 upgrades is removal of the engine. It's possible to swap the cam and heads with the engine in the car, but by the time the engine has been torn down this far, it doesn't take much more to pull it out, making the following engine work easier—and besides, leaving it in requires removal of some chassis parts to loosen and lower the front of the oil pan. As such, Lingenfelter recommends sending your car in for the work. The alternative is tearing it down yourself, adding the parts individually and sending in the car's controller for calibration.**

03 With the engine out of the Corvette and on a stand, the front-end accessories, timing chain cover, fuel system and finally the heads are removed. It's a time-consuming process, but with its architecture rooted in the previous LS family, tearing down the LT1 is comparatively easy and straightforward.



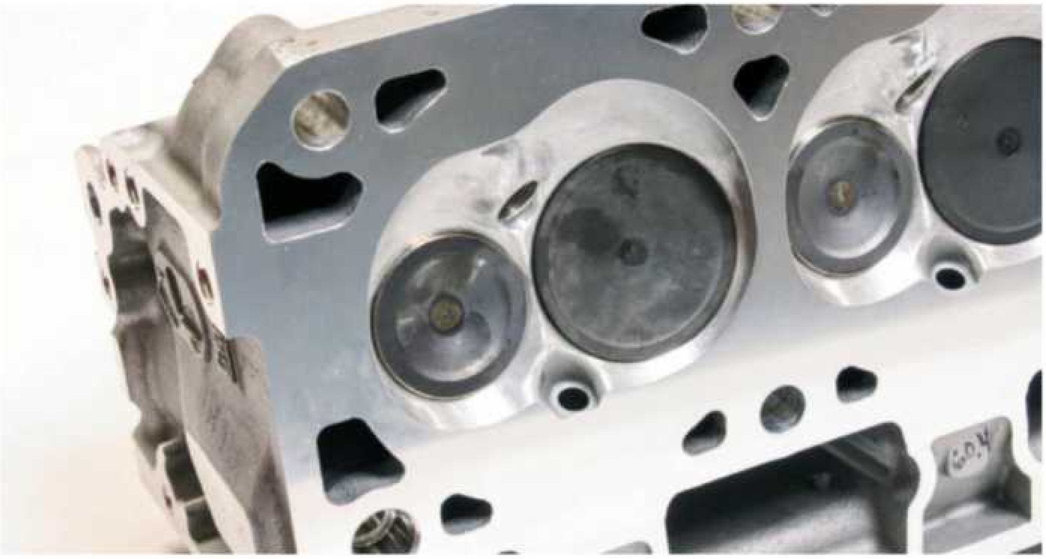
04 Next, the camshaft is slated for removal, which first requires the cam phaser to be removed. That involves rotating the engine so the crankshaft gear's timing marker is pointing at the 12 o'clock position and the camshaft phaser gear timing marker is pointing at 6 o'clock—the dot-to-dot lineup. A 24mm socket is required to loosen the cam phaser bolt and extreme care must be used with the delicate phaser reluctor wheel on the front, which can be easily damaged. The phaser bolt is a one-time-use fastener and a new one is used during assembly.



05 After the phaser mechanism is removed, the original camshaft slides out easily. The lifters were removed when the heads were, so there was no concern about supporting them as the camshaft was pulled out of the block. It's immediately clear the LT1 cam's lobes have larger base circles than the LS camshaft's, along with wider ramps, to support the cylinder deactivation feature. The larger lobes also facilitate quicker valve actuation on the high-revving engine.

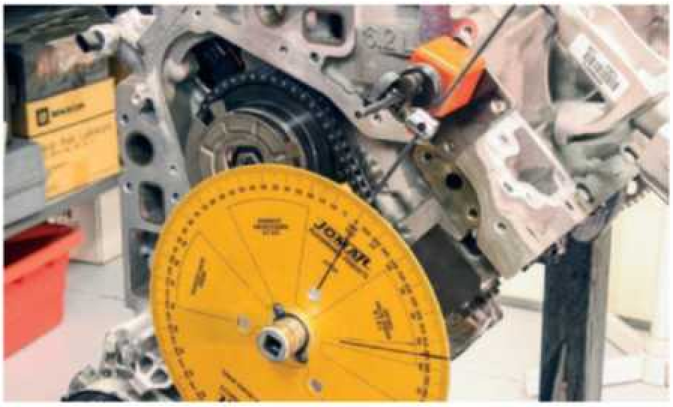
06 Lingenfelter's CNC-ported cylinder heads are modified versions of GM's castings. Out of the box—or off the production engine—they offer airflow capability comparable to the LS3 head, but with a greater emphasis on high-rpm performance.

07 The intake runners on Lingenfelter's CNC heads are taken to 308cc—about 4 percent larger than the stock 297cc size. The exhaust runners are enlarged about 3 percent, from 107cc to 110cc.



08 The stock 2.13-inch hollow-stem intake and 1.59-inch exhaust valves are retained, but a three-angle valve job is performed to enhance airflow in and out of the uniquely shaped, 59cc combustion chamber. Note the hole at the bottom of the chamber. It's where the fuel injector protrudes, rather than in the intake manifold of a conventional port-injected engine. With the stock pistons, this setup delivers a 12:1 compression ratio.

09 Designed by Lingenfelter and manufactured by COMP Cams, the camshaft in this 550hp package is designed for a moderate idle quality and the retention of the factory cylinder deactivation system. The lift specs are 0.576-inch on both sides, but the duration specs differ between the lobes working the "regular" lifters and the collapsible lifters for the cylinders that shut down on the highway. For the regular lifters, the duration at 0.050-inch valve lift is 217/229 degrees. On the deactivating lifters, the duration is 219/231 degrees. The lobe separation angle for both sets of lobes is 116 degrees.



10 Installation is basically the reverse of the removal procedure, with a new bolt used to install the phaser to the camshaft. Not surprisingly, the variable valve timing system is dependent on dead-nuts accuracy when it comes to the cam's installation, which is carefully degreed. It's another reason the engine work is easier with the LT1 removed from the vehicle.

11 With the camshaft degreed, the heads are then installed. The head bolts are designed to stretch for more accurate and secure location, so new bolts should be used with the installation. Note the multilayer steel head gaskets being used, too.

12 Complementing valvetrain components include the stock lifters and pushrods, but new dual-coil valvesprings replace the stock beehive-type springs to support the higher-rpm capability the new camshaft enables. They are used with titanium retainers and 10-degree locks.

13 The stock 1.8-ratio rocker arms are retained and that's not a bad thing. Although they don't have roller tips, they have roller fulcrums, which is actually more important for reduced friction. The design has been proven over the years with other high-winding LS engines.

14 Here's a look at the business end of one of the direct injection fuel injectors, as the fuel system is up next in the engine's assembly. It works very much like the piezo injectors in a diesel engine to deliver a very finely atomized, almost mist-like, fuel spray. Lingenfelter says the stock injectors have no trouble supporting the nearly 100hp increase this package offers.

15 The fuel system comes together further with the installation of the fuel rails in the heads and the unique, engine-mounted ultra-high-pressure fuel pump for the direct injection system. Driven by the camshaft via a unique "tri-lobe," it generates about 2,175 psi. No kidding. The pressure is even greater in the Corvette Z06's supercharged LT4 engine.

16 Next, the front of the engine is reassembled. Here, the LT1's unique, space-saving offset water pump is bolted in place. That will just about do it before the engine is reintroduced to the chassis.

17 Finally, the enhanced LT1 slips back into its berth between the Stingray's front fenders. There are a number of items that are more difficult to work on with the C7 cars, including exhaust removal, but once the engine is disconnected from the torque tube, it's surprisingly easy to remove and re-install it.

18 Tuning is the next step. Not surprisingly, Lingenfelter was mum about the specifics of their calibration. If it's not feasible for a customer to ship his or her car to the company's Decatur, Indiana, facility for the entire procedure, the alternative is ordering the parts separately and sending in the ECM to be calibrated by Lingenfelter.

19 On the Dynojet chassis dyno in Decatur, the upgraded Stingray project vehicle delivered as advertised, putting down 461 rear-wheel horsepower (416 rwhp stock), which is pretty much spot-on for the 550hp flywheel promise—a couple more horses, even. Torque registered 422 lb-ft at the wheels, or about 506 at the flywheel. It's an engine that definitely likes to breathe and the greatest seat-of-the-pants performance gain came in the upper ranges of the rpm band. It may not have the low-end punch of a Roots-style supercharger, but there's no heat soak to worry about, either. There's less weight over the nose than with a blower car, too.

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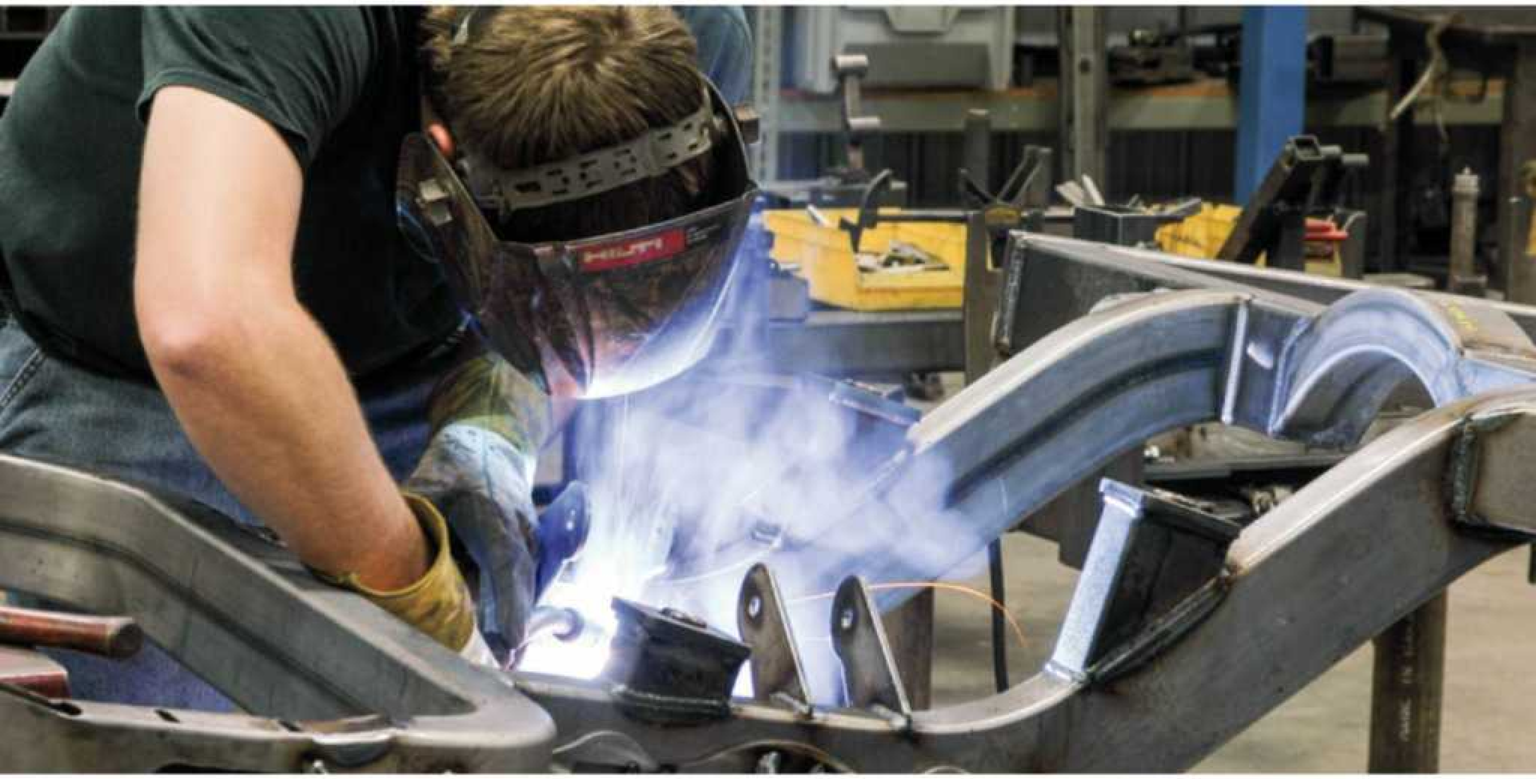
BONES FOR THE BEAST

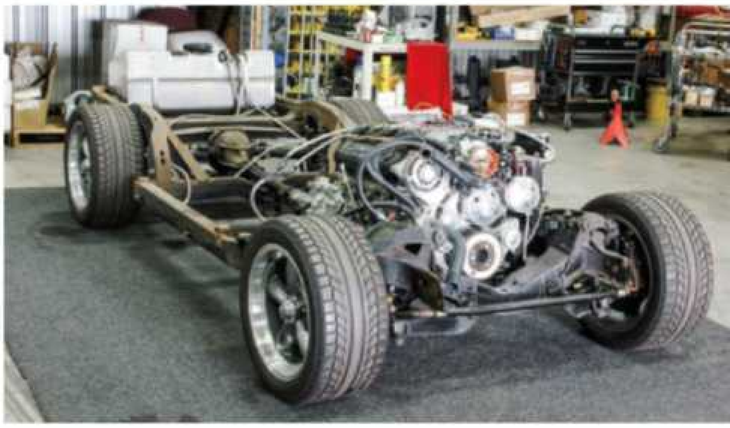
BUILDING A CUSTOM CHASSIS FOR OUR 1972 COUPE PROJECT

BY **JEREMY D. CLOUGH**

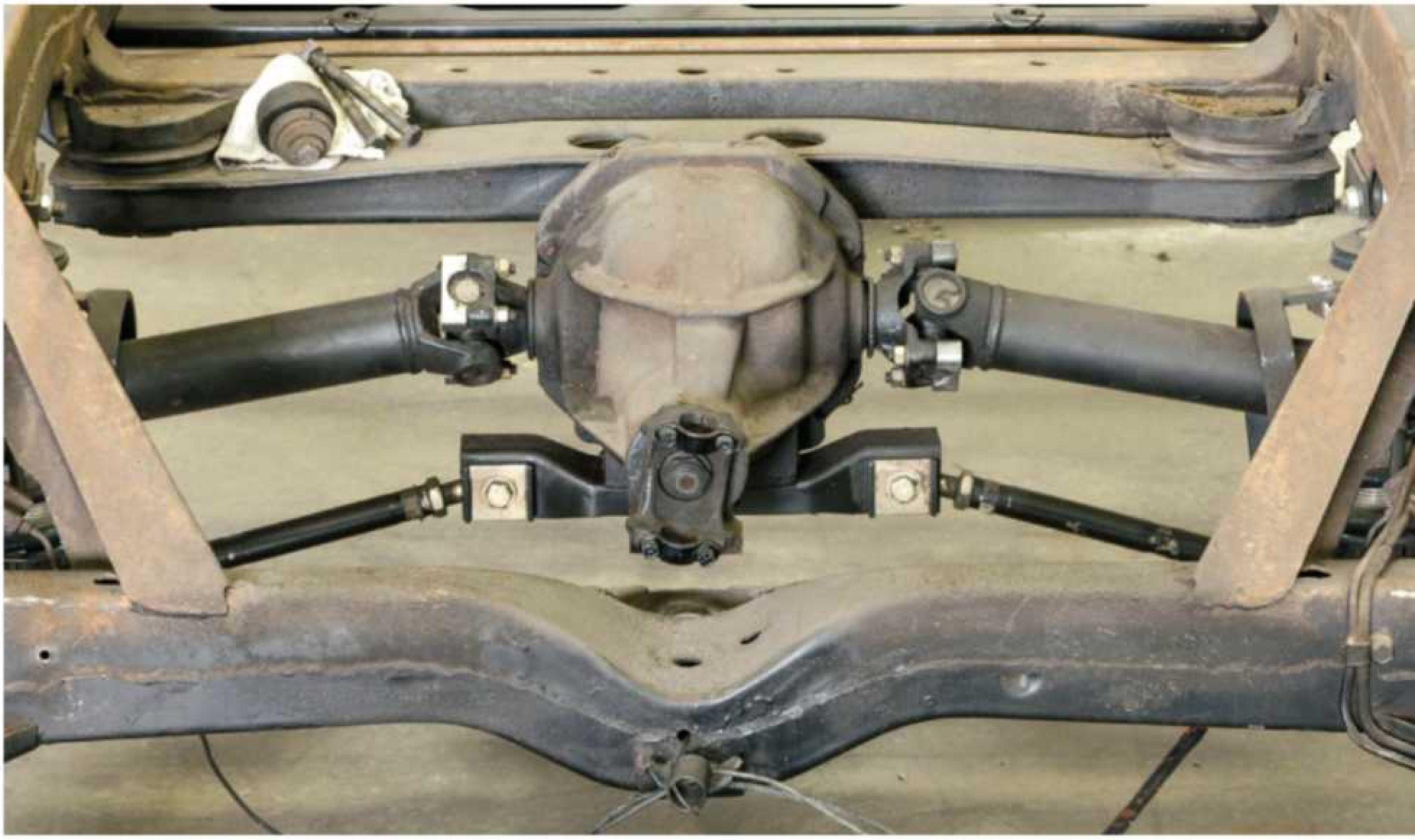


After wrenching on Scarlett, our '72 coupe project car, for well over four years now, you may wonder what's left to do. We started with easily reversible bolt-on mods such as a Zex nitrous oxide kit, stock-replacement brakes from Wilwood, a suspension rebuild that included a Van Steel rear coilover conversion, Corbeau seats and harnesses, and ECPB electric conversions for the headlights and wiper door. This was Stage 1; bolt-on, reversible and reasonable. We went down the rabbit hole during Stage 2 when we tore the car down to install a FAST-managed 416ci LS3 backed up to an American Powertrain T-56 Magnum, and then installed Vintage Air A/C, custom gauges and all the wiring to make it work. What we didn't do was anything to get the power safely to the ground. Despite a certain detached journalistic curiosity about how long the rear diff would live when you pull the pin on over 600 hp, prudence demanded a safer alternative. Welcome to Stage 3, where we build, equip and install a custom C7-based Street Shop chassis that will let us safely manage that kind of power without damaging the car or driver.

Before we get to the "what," we need to answer the "why"—why perform the sometimes-drastic modifications and make the substantial financial investment in a new chassis rather than add new components to the original? After all, if our g-meter is to be believed, Scarlett hit 1 g with her



01 Here is Scarlett's factory chassis after the body lift. While we were able to make substantial improvements to it, the performance of the parts we added is ultimately limited by the foundation, and the 50-plus-year-old design of the C2/C3 chassis leaves much to be desired when compared to the modern Corvette chassis.

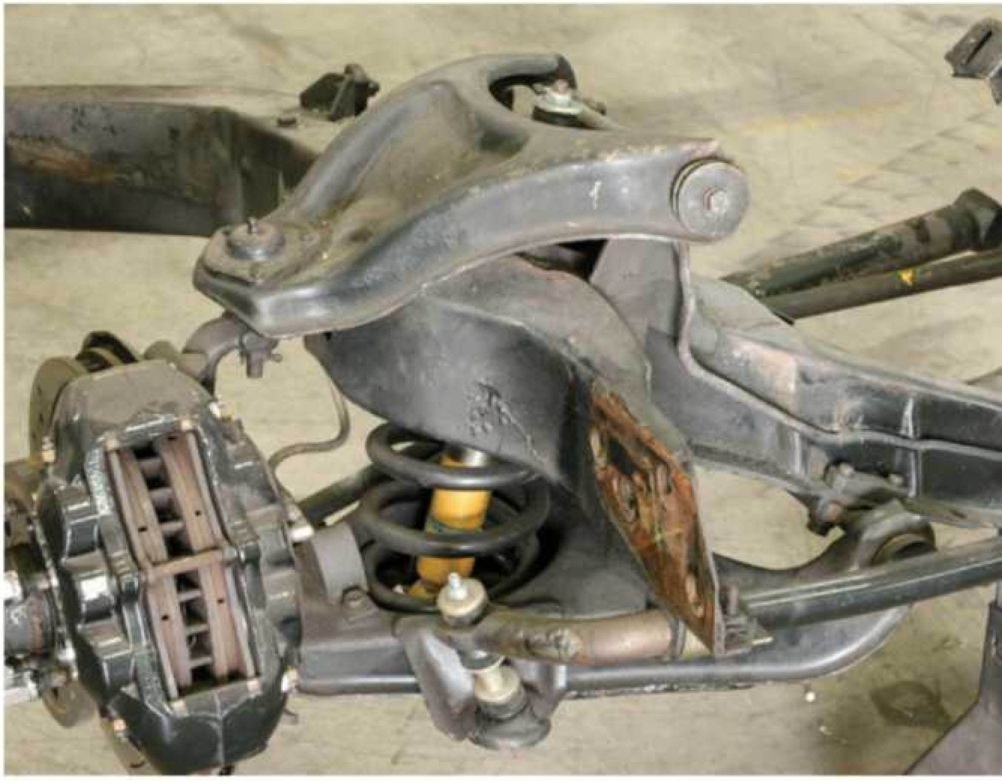


02 **The C3 rear suspension has two links that control the camber gain of the rear wheels: the lower camber bars, which we upgraded, and the halfshafts, which tend to wander in and out of the differential, leading to sometimes dramatic changes in handling. It was state of the art when it was introduced to the U.S. … around the same time as Beatlemania.**

new suspension, and there's no arguing with the track performance of stock-framed cars like Ridetech's 48 Hour Corvette or Danny Popp's wicked, blue '72. These are, however, the exceptions that prove the rule.

The first limiting factor to the original frame, other than age and—in many cases (though not ours)—rust, is its flexibility. That's the reason why you can't always open the doors when the car is on a lift. Upgrades like stiffer springs can only work effectively if they have a firm surface to work against; otherwise, it's the frame that gives, not the spring. When I stiffened the springs on my old '71 big-block convertible, the chassis flexed so much it would pop the rear latches of the convertible top loose just going down my driveway. No matter what you add to the frame, that flexibility remains, limiting the effectiveness of other modifications. This isn't a new discovery. The Chevy Power Manual had extensive instructions on how to stiffen a C3 chassis for racing use, and that was over 30 years ago.

Some flex can be attributed to design, but



03 **The front C3 suspension has a C-channel construction in the front framehorns and the stamped steel control arms. Not installed in this photo is the front shock tower brace we previously installed between the upper control arm mounts to minimize flexing under load.**

the more obvious issue is construction. The framerails are folded from sheetmetal some 0.095-inch thick and stitch-welded rather than welded the entire length of the seam. Adequate … perhaps, but not optimal.

The second limiting factor is the use of a factory-layout suspension. While there are many excellent upgrades that offer significant improvements to the stock three-bar independent rear (trailing arm, camber bar, and the ever-dynamic halfshaft) there are intrinsic geometry problems the aftermarket hasn't yet fully solved. No matter the parts you bolt into the factory holes, using the original pickup points means accepting those limitations,

04 One of the shortcomings of the original frame is in the material, sheetmetal roughly 0.095-inch thick that has been bent over and welded to create the 'rails. While perhaps adequate for the cars as delivered, the amount of power we've put in Scarlett requires something with far greater strength.

05 In addition to the thin material used, factory frames also were stitch welded rather than fully welded down the seams, which meant even the limited strength of the material used was not fully realized.

06 Here's what a Street Shop frame starts as: mandrel-formed framerails made of 4x2-inch box tube, which is substantially stronger than the factory 'rails.

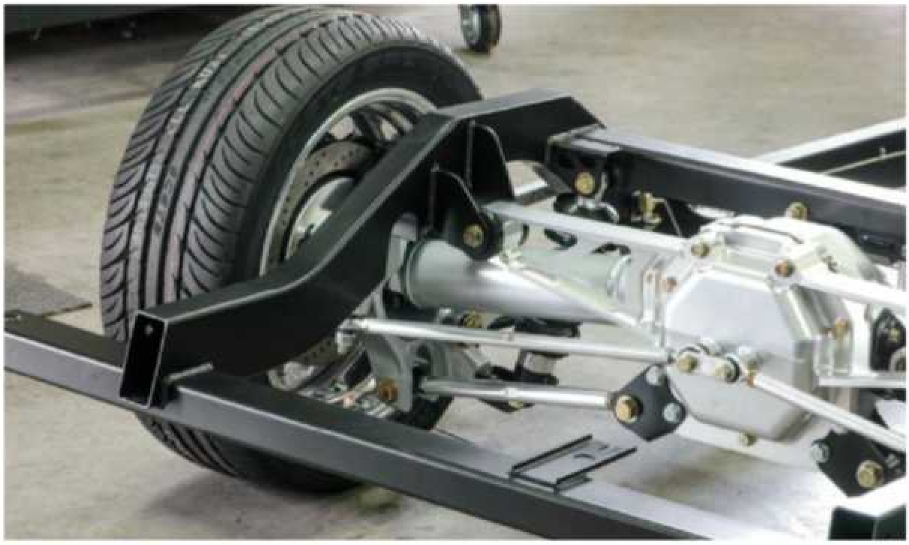
07 In addition to the strength increase of using square tubing as opposed to a bent piece that's partially welded, the tubing walls are 0.120-inch rather than the nominal 0.095-inch of the factory frame material. Even with the added material, a finished C4 or C7 frame weighs about 50 pounds less than a factory frame.

which are unsurprising when you remember the C2/C3 suspension debuted in 1963. Even more radical options such as the Guldstrand five-bar conversion intended to overcome some of the shortcomings of the often-unpredictable Shark rear suspension are still a far cry from the Short/Long Arm type suspension that's now been under Corvettes since 1997. When you start with a clean sheet of paper, however, and don't mind cutting a little fiberglass, the world opens up.

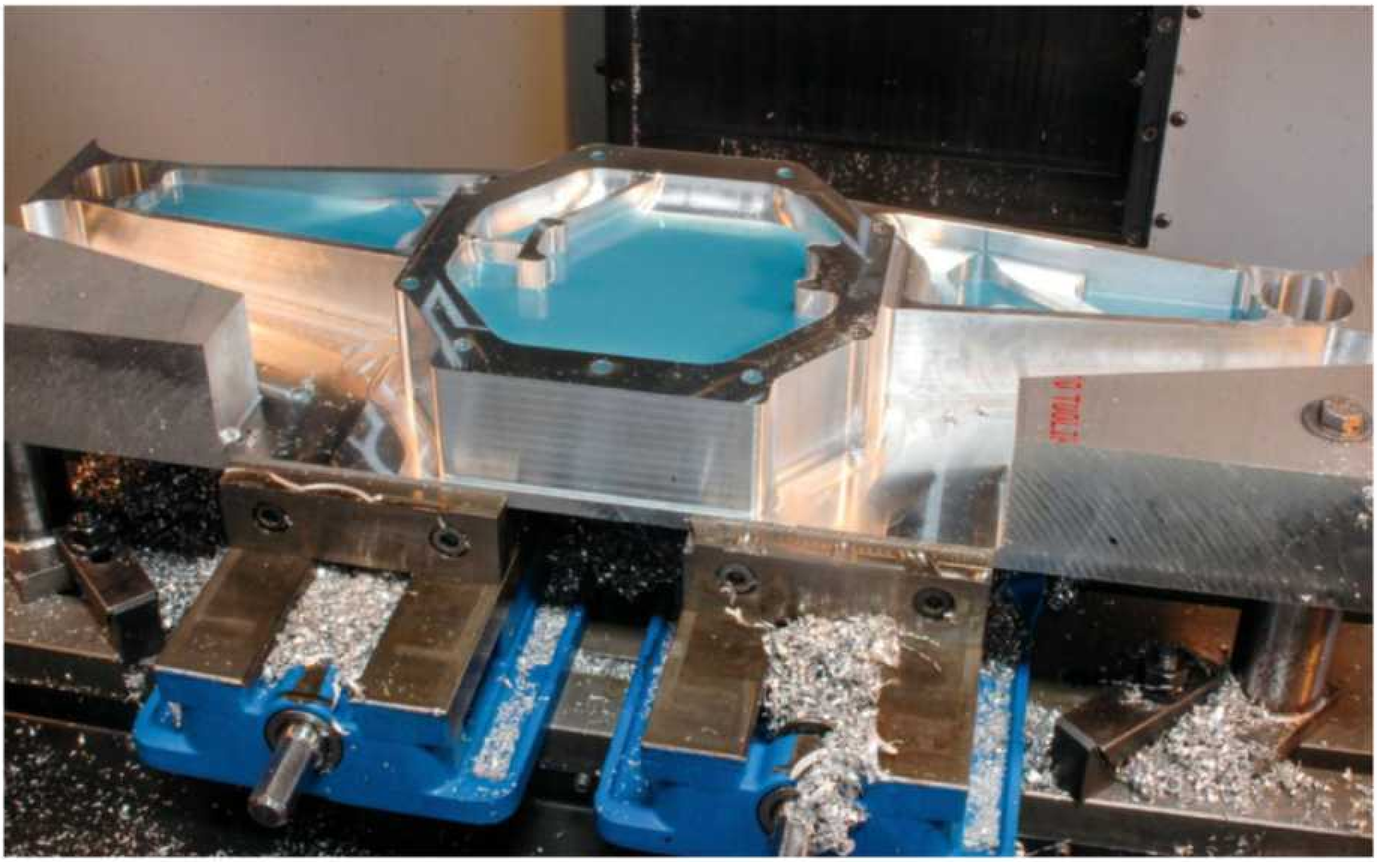
While there are several companies making chassis that use later-model suspension components, we chose the Athens, Alabama-based Street Shop, Inc. Founded by Tray Walden in 2001, Street Shop is one of the pioneers in custom chassis, with three patents to its credit, and C3 frames range from a drop-in model featuring late-C4 suspension all the way to a C7-based version using the latest in Corvette suspension technology. You won't have a hard time guessing which one we picked. Even though the C7 components take up more room (which requires reworking the luggage area of the car), and costs more than the C4 option, when we considered the performance gains and the ability to take larger tires offered by the C7 version, we felt it was best in line with our build philosophy for this car.

Starting with mandrel-formed 'rails made of 2x4x0.120-inch wall rectangular tubing, all Street Shop chassis are jig-built using components designed and manufactured in-house on equipment such as its high-definition CNC plasma cutter and Haas CNC mill.

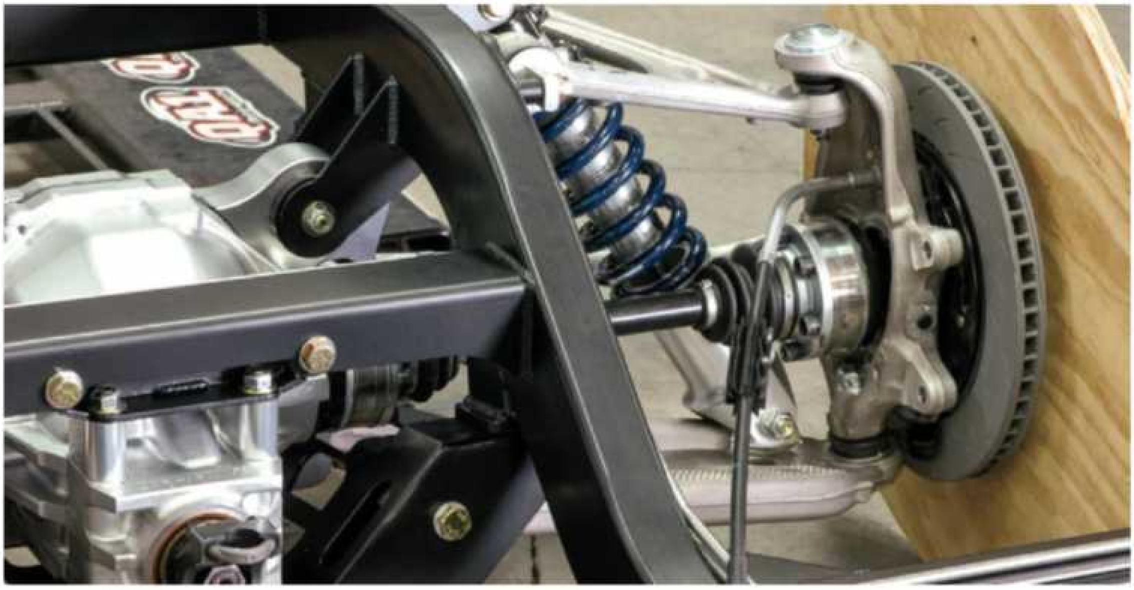
Although some components like halfshafts are made to its specs, most C7 suspension parts are OEM Corvette pieces, so things like spindles and A-arms are easily available from your local dealership or parts house, ensuring ready parts availability for years to come. As for things like brakes and shocks, the sky, as we'll see later, is the limit. **VETTE**



08 **Here is a Street Shop frame for a C1 shown with late-C4 rear suspension. In C2 and C3 applications, the C4-equipped frame installs without modification, making it a popular option for those who want to later return the car to original for resale value.**



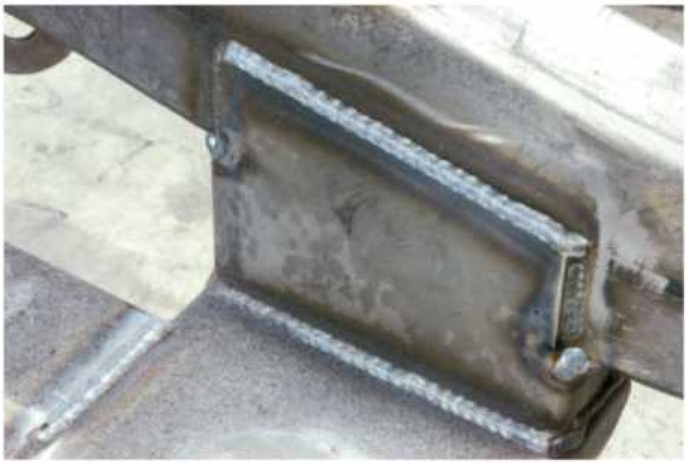
09 **If you were looking closely in the previous photo, you realized the "batwing" used for the C4 suspension is not a factory cast piece. Street Shop machines its own batwing/rearend housing in-house from a massive piece of 6061 aluminum.**



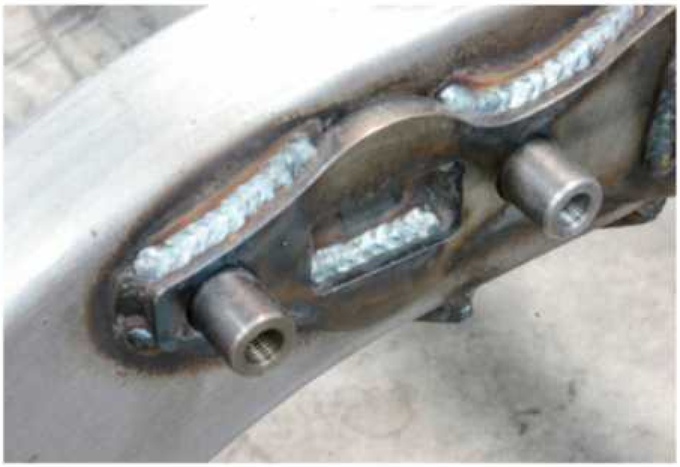
10 The rear suspension of a C7-based chassis is a more involved installation—the A-arm design takes up more room, which means heavily modifying the luggage area. There's a tremendous performance advantage to be found in using the suspension from a current-production Corvette.

11 Street Shop cuts the frame components using an HD CNC plasma cutter. The ability to draw things in a CAD program and then quickly turn that drawing into cut steel makes it possible for Street Shop to fabricate virtually all of the pieces required to build the chassis in-house.

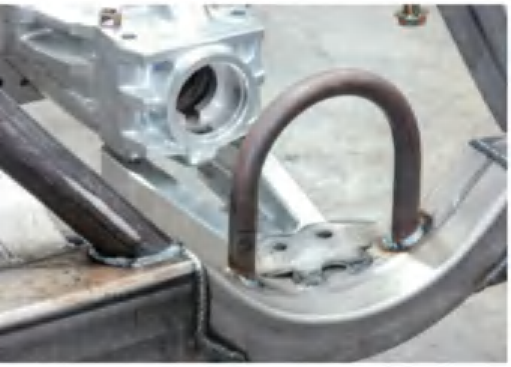
12 After the plasma cutter and depending on which parts they are, they will either go to the Betenbender press brake for bending into their final shape or to the frame jig where they'll be clamped and welded into place.



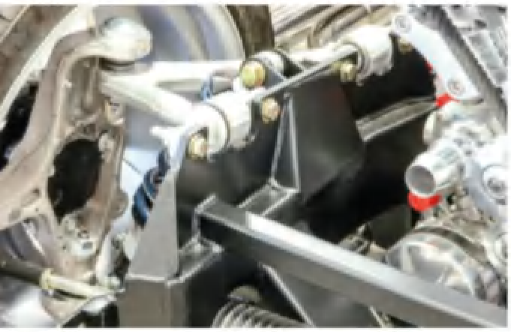
13 This is the front crossmember where it meets the framerail. Note the consistency of the weld and how it's fully welded around its perimeter. This is standard for pretty much all joints on the frame.



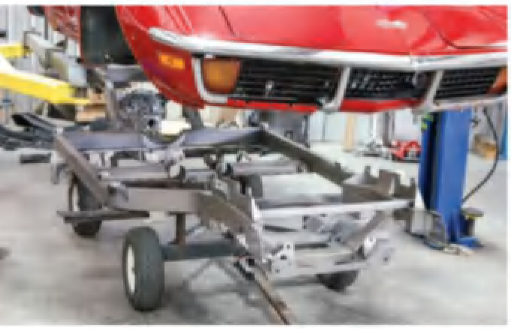
14 At the rear of the frame, the mounting point for the upper A-arm of the C7 rear suspension is fully welded on both the outside and the inside.



15 While frames can be built on a standard package, they're more often built to spec for a customer's specific needs. In our case, we asked for a driveshaft loop that would contain the shaft should it break during hard use. This will meet the requirements of racing sanctioning bodies.



16 The front, passenger-side mount for the upper A-arm is made of 3/8-inch material as well as the reinforcement front, rear and middle, and the welded-up reinforcement bar that ties both sides together, much as we used a shock tower brace on the factory frame.



17 The completed chassis is ready to be fit to the body. This is usually done prior to powdercoat in case any minor adjustments need to be made—and to keep from scratching up the frame's finish.

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A DIFFERENT BIG-BLOCK CORVETTE

WHAT IF CHEVROLET OFFERED A BIG-BLOCK OPTION IN 1960?

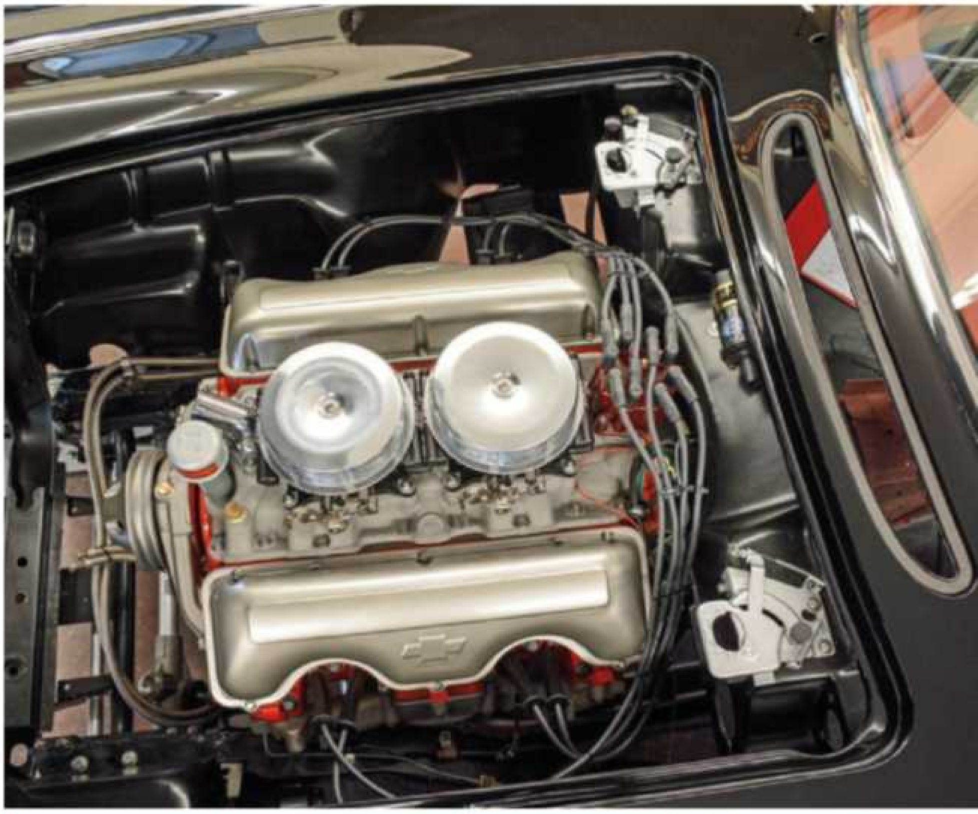
BY **GERRY BURGER**

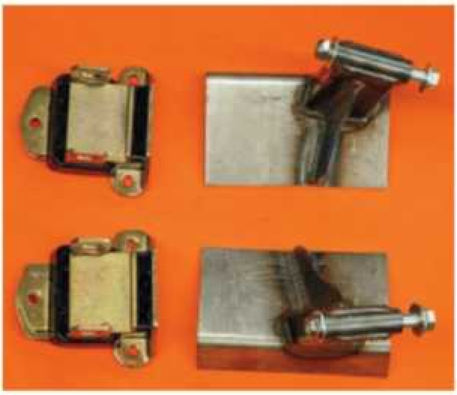
We've been working on bringing our 1960 Corvette back to life for the last year. The car was last used as a drag car with a 396 big-block under the hood; it then went into hibernation in a fellow hot rodders garage sometime in the early '80s. When we purchased the car the engine and transmission were long gone, but other than some minor cutting up of the frame the car was in relatively good condition. As a matter of fact, soda-blasting revealed a very nice, no-hit body with only the lower front pan having seen repairs from curb damage.

With the suspension swap completed we turned our attention to choosing an engine. We wanted an era-appropriate engine in the car, so at first we were leaning toward building a 283 or 327. Remember, this was never going to be a numbers-matching car; far too many parts were missing for that approach. While considering something like a 283ci/270hp we discussed the old 396 that once powered the car and wondered aloud: What if Chevrolet had offered a big-block option in 1960? The answer to that hypothetical question was simple enough; they would have installed a 348-cubic-inch "W-motor" (so named for the unique valve cover configuration) under the hood. Since the 348 was introduced in 1958 almost any quad-headlight C1 could have been so equipped. The 348ci/335hp would have been the ultimate answer as the 409 would not arrive on the scene until 1961. The more we thought about the 348, the more we liked the idea.

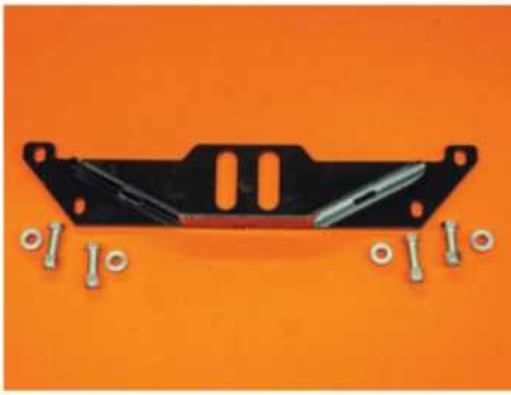
Taking the "What if?" theory one step further we decided to build a 348 and dress it out in a pure factory style. No chrome, no bling, no billet, just a painted engine with cast-iron exhaust manifolds and a dual-quad intake. Atop the Offenhauser low-profile, dual-quad intake we mounted a pair of FAST TBI units topped with early Corvette breathers. This provides a factory look, but with all the benefits of a modern fuel delivery. The engine would be coupled to a TCI Automotive 700-R4 since this particular C1 is built to cruise.

We took our engine to our local engine machine shop, Roberts & Son in





01 **After swapping out the front suspension in our 1960 Corvette, it was time to convert to late-model side-mount motor mounts. While we are mounting a 348 W-motor to the frame, these adapters were designed for the small-block engines.**



02 **To complete the installation we would need a new transmission crossmember to support our TCI 700-R4. The engine mounts and crossmember are from Martz Chassis.**

Chattanooga, Tennessee, to be bored 0.030 over and balanced. They also handled the valve job after we ported and polished the stock heads in our home shop. We filled the block with forged pistons and an Isky flat-tappet cam and held everything on and in the engine together with ARP bolts. While the machine work was being done on the engine we wanted to set up the motor mounts. Now, you know you've brought your vintage engine to the right guy when he has an extra 348 block to loan you for motor mount setup while they perform the machine work.

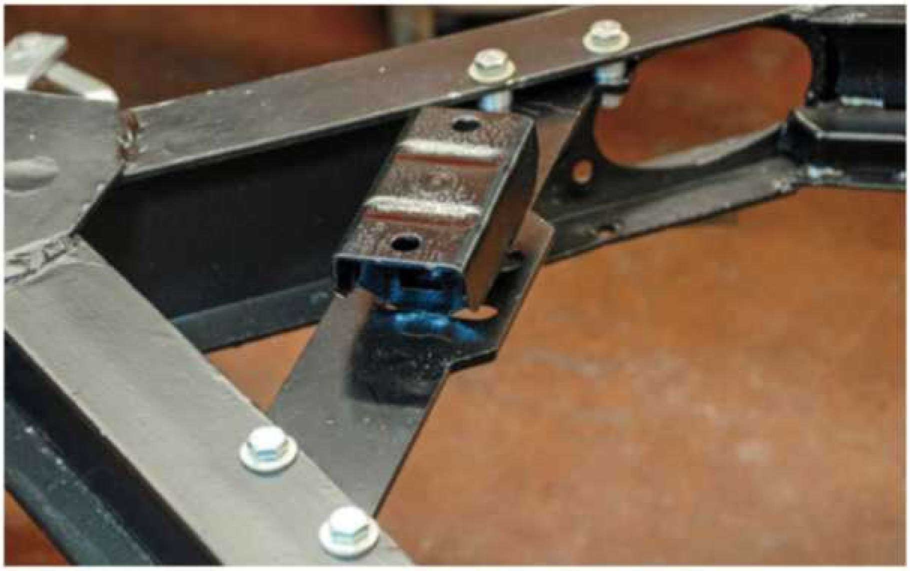
Armed with this spare block we set about installing the W-motor in the stock 1960 Corvette chassis. First, we bolted the block to our TCI 700-R4 transmission. We had ordered a rear transmission crossmember from Martz Chassis along with their motor mount kit. One of the many things to love about Chevrolet is the high interchangeability rate. The same motor mount kit for the small-block will also locate our 348. Of course, hood clearance is always an issue with the C1 Corvette, but research indicates the W-motor is actually 1 inch shorter from the center of the crankshaft to the top of the intake manifold. Using the Offenhauser low-profile intake may provide even a bit more room than the stock intake.

With the engine block and transmission swinging from our engine hoist, we bolted the motor mounts and frame adapters to the block. The transmission crossmember was bolted in place using the factory holes in the frame for perfect location. We lowered the assembly into position with the rear transmission mount resting on the new crossmember, the frame adapters settled on top of the framerails.

This was almost too easy, but we did spend an hour or so fussing with getting the engine perfectly centered in the frame, leveling the engine from side to side and arriving at about a 3 degree front to rear angle. The 700-R4 cleared the center of the X-member nicely and the engine had plenty of room between the framerails. We arrived at the front to rear location by bolting the assembly in the center of the slotted holes in the crossmember.

After measuring several more times, we tack welded the frame adapters to the framerails and lifted the spare block and new transmission out of the chassis. We finished welding the frame adapters to the framerails, did some sanding, priming and blending in of our semi-flat black chassis and the job was done. We were very pleased with the entire installation and everything fit and worked perfectly.

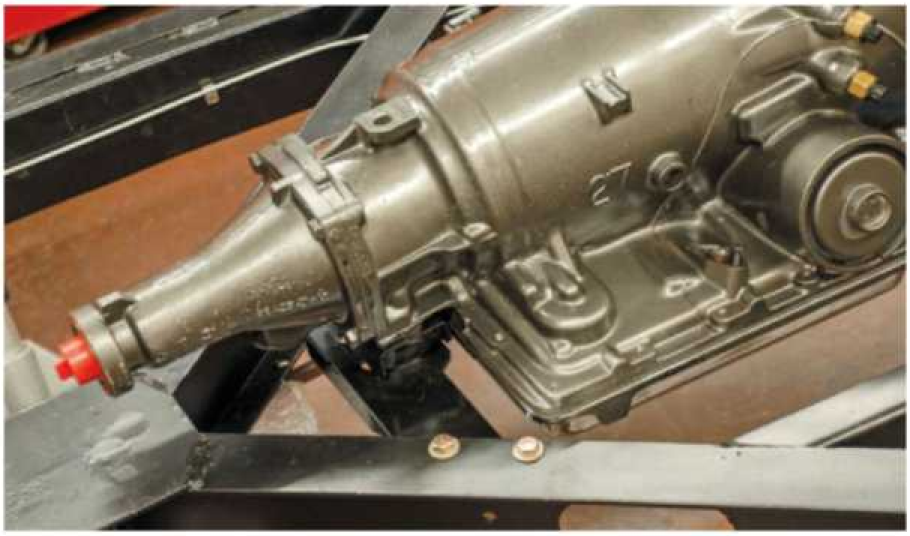
After building our engine, we installed the TCI converter in the transmission (remember to fill it first) and then bolted a new TCI flexplate to the crankshaft. The original 348 flexplate will not work with the 700-R4. We then joined the 348 engine and trans together for the final time and installed them in the frame. A Powermaster hi-torque starter will spin the engine



03 **Installing the new transmission crossmember is a simple affair, employing existing holes in the frame. Spacers and bolts locate the crossmember. The rubber mount bolts to the transmission tailshaft.**

04 **We located a spare 348 block for setting up the motor mounts. Using an empty block makes set up easier. The motor mounts are bolted to the engine with the frame adapter bolted to the motor mount.**

05 **We coupled the spare block to our new 700-R4 transmission and lowered the assembly into the chassis. The Currie 8-inch rear will handle the power of the W-motor.**



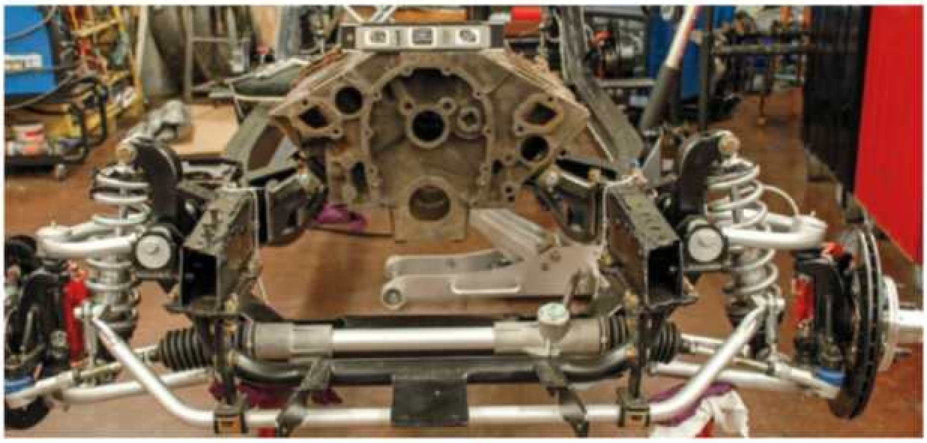
06 **The transmission crossmember is slotted, and we bolted the transmission in place in the center of the slots. This effectively determines the fore/aft location of the engine.**

with ease and save both weight and space. With the stock exhaust manifolds installed on the engine, there was ample room for exhaust. The firewall clearance was perfect.

The final connection in the driveline comes in the form of a custom aluminum driveshaft from Inland Empire Driveline. When consulting the experts at Inland, they recommended an aluminum shaft as modern overdrive transmissions do not take well to the heavier steel units. The driveshaft arrived and was a perfect fit between the 700-R4 tranny and our Currie 8-inch Ford rear. The driveline was complete. We also took the time to route our transmission cooling lines using Jiffy-tite quick disconnect lines. We also mounted the Lokar shift indicator switch, Lokar flexible dipstick and the TV cable for the 700-R4. This was much easier than doing it with the body in place.

There is a lot to consider with an engine swap in a C1. Because the transmission sits on top of the X-member, the driveshaft angle can be extreme. This also limits how low the engine can be mounted in the frame, which in turn makes hood clearance a real issue. After putting our body back on the frame it was apparent that the front FAST throttle body was very close to the hood. However, we had to modify the early Corvette air breathers to fit the FAST fuel injection and we

07 A test-fit of our 3-inch aluminum driveshaft shows ample clearance for the yoke. Inland Empire Driveline manufactured the custom driveshaft.



08 With the engine resting on the frame adapters, we adjusted them until the engine was level from left to right and also achieved approximately a 3-degree angle front to rear. We also checked to ensure the engine was centered in the frame.

Sources

ARP	800/826-3045	www.arp-bolts.com
CORVETTE CENTRAL	800/345-4122	www.corvettecentral.com
CURRIE ENTERPRISES	714/528-6957	www.currieenterprises.com
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09 Next, we tack welded the mounts in place, checked and rechecked our level and measurements. One final check was to ensure the motor mount bolts slide in and out easily. They should not be in a bind. [This is the driver-side mount.]

10 The passenger-side mount is very similar and we tack welded them in place with our Miller TIG welder. The brake lines were all removed prior to final welding with our MIG as welding spatter and excessive heat can damage brake lines.

11 Here is the engine and transmission mounted in the frame prior to final welding. The engine sits quite high in the C1 Corvette frame, and while it would be nice to lower the engine an inch or so, that complicates the driveshaft angle.

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RACE DAY 3

WILD HORSE PASS
MOTORSPORTS PARK
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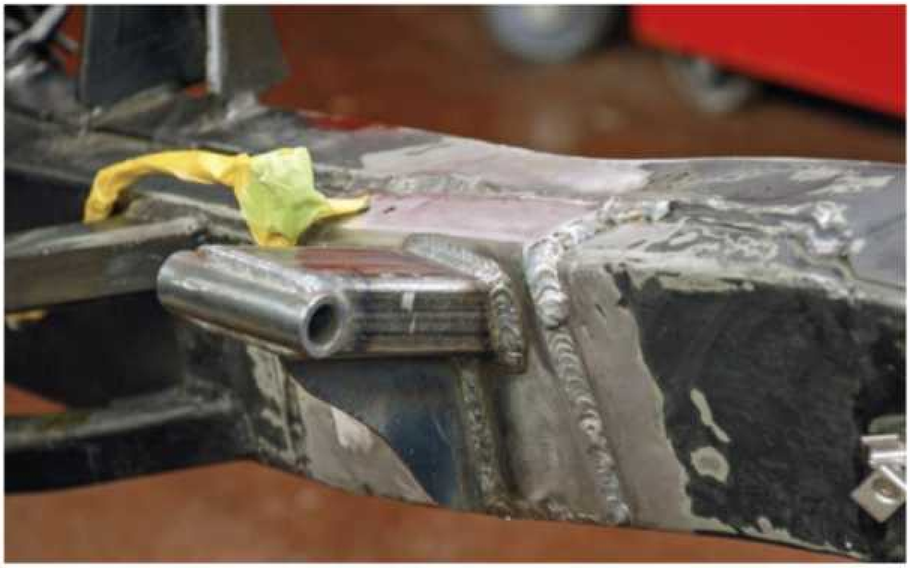
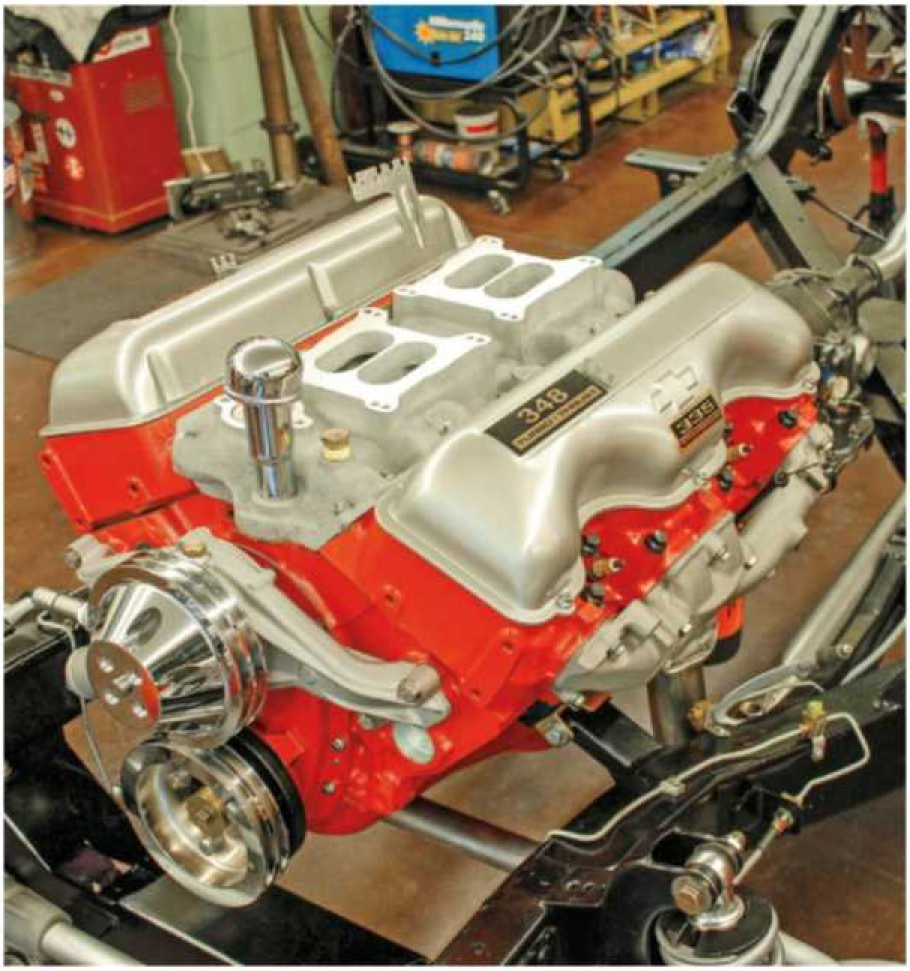
ended up with about 3/4-inch between the hood and the front air breather. Bear in mind the FAST TBI is shorter than a four-barrel carburetor, so that provides some extra room and the Offenhauser low-profile intake is very low. In the end it all fit but we'd be lying if we didn't say there were some tense moments fitting the breathers. And with 20/20 hindsight we may have lowered the engine an inch and spaced the tranny down an additional 1/2-inch and let the driveshaft angle suffer a bit, particularly if you plan on running dual-quad carburetors. A single four should be no problem. Happily, there were no clearance problems with the TCI tranny and the factory floor in the car.

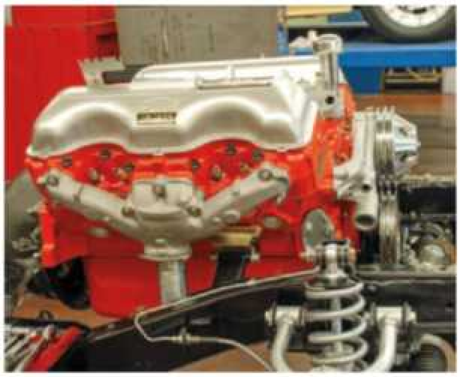
With the FAST-EZ dual-quad injection sitting under early Vette air breathers, the engine really does look like it a factory option. The engine will produce over 300 horsepower, which is ample for the 58-year-old chassis and plenty of power for a vintage road car. It all makes you wonder not only "What if?" but also "Why not a big-block Corvette in 1960?" **VETTE**



12 **Certain that everything was in position, we did the final welding with our Millermatic 140 MIG welder. This was followed by sanding and blending the chassis paint.**



13 **We built the engine in our home shop and dressed it in vintage style. While Chevrolet never offered the W-motor big-block in 1960, if they had, this is what it would look like.**



14 **The motor mounts provide plenty of room for exhaust, and while we opted for stock manifolds there is room for headers, too. These mounts are designed for small-block applications but work fine with the 348 engine.**

15 **With the engine and transmission in place we decided to install the neutral safety switch, back-up light and shift indicator switch on the transmission prior to putting the body on the frame.**

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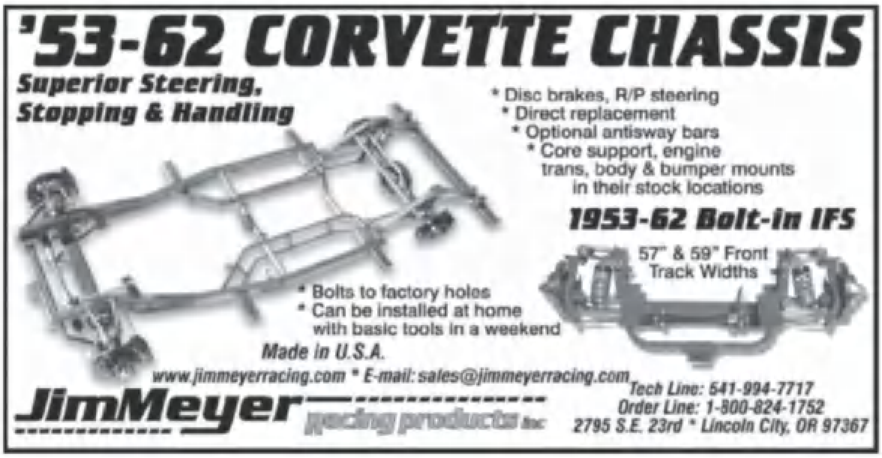

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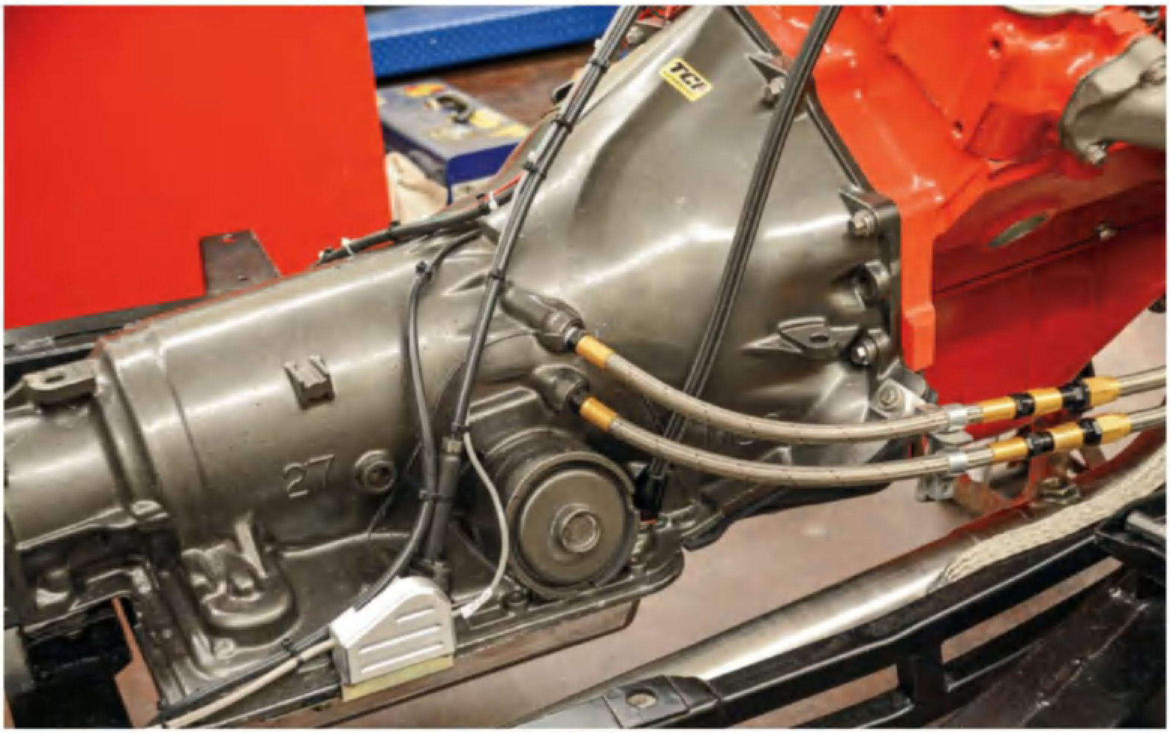
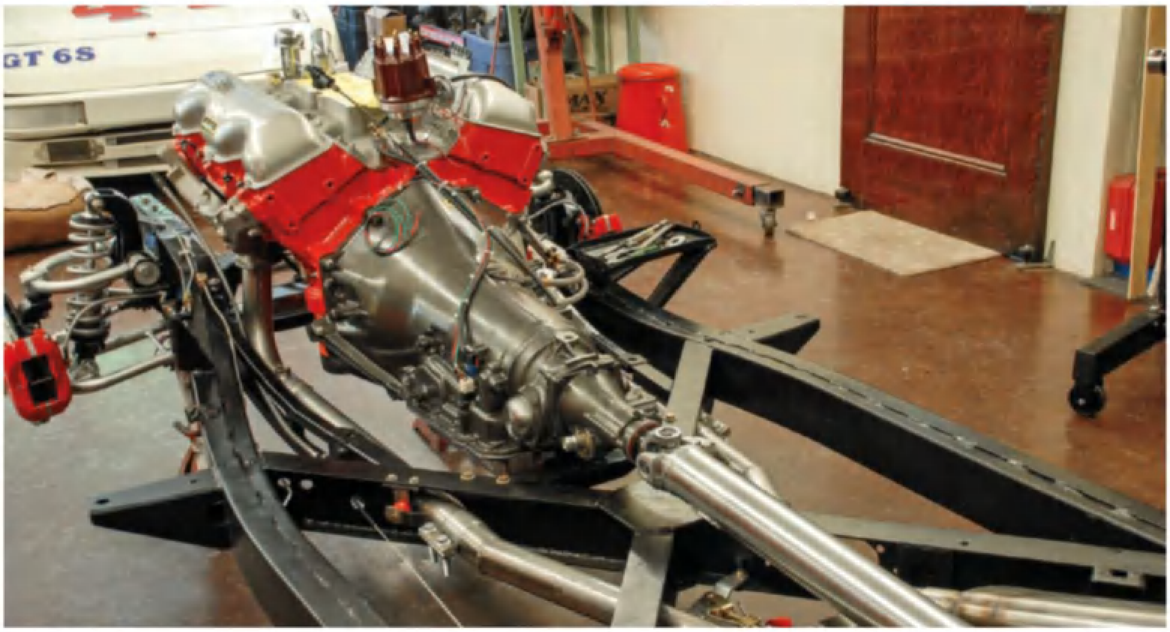
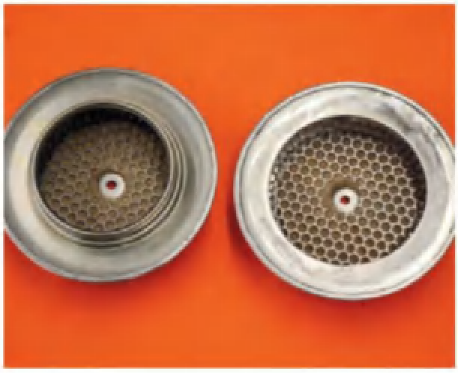


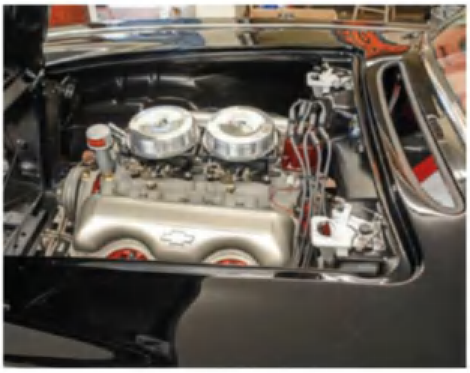
16 The Lokar unit bolts in place on the passenger side. We also installed quick-disconnect cooling lines from Jiffy-tite, a flexible dipstick from Lokar and the TV cable from TCI Automotive.



17 Looking forward from the rear of the driveline, it looks like a factory installation, from the aluminum driveshaft to the homebrewed 2-inch stainless steel exhaust.



18 Engine clearance on the front FAST TBI unit was minimal. We used a pair of '57 Corvette breathers from Corvette Central and modified the bottom to fit the FAST units. The modified unit is on the right. This also lowered the breather.



19 FAST dual-quad fuel-injection units are actually lower than an AFB carburetor. The early Corvette air breathers add vintage Corvette flavor to the engine bay, giving us performance and style in equal parts.

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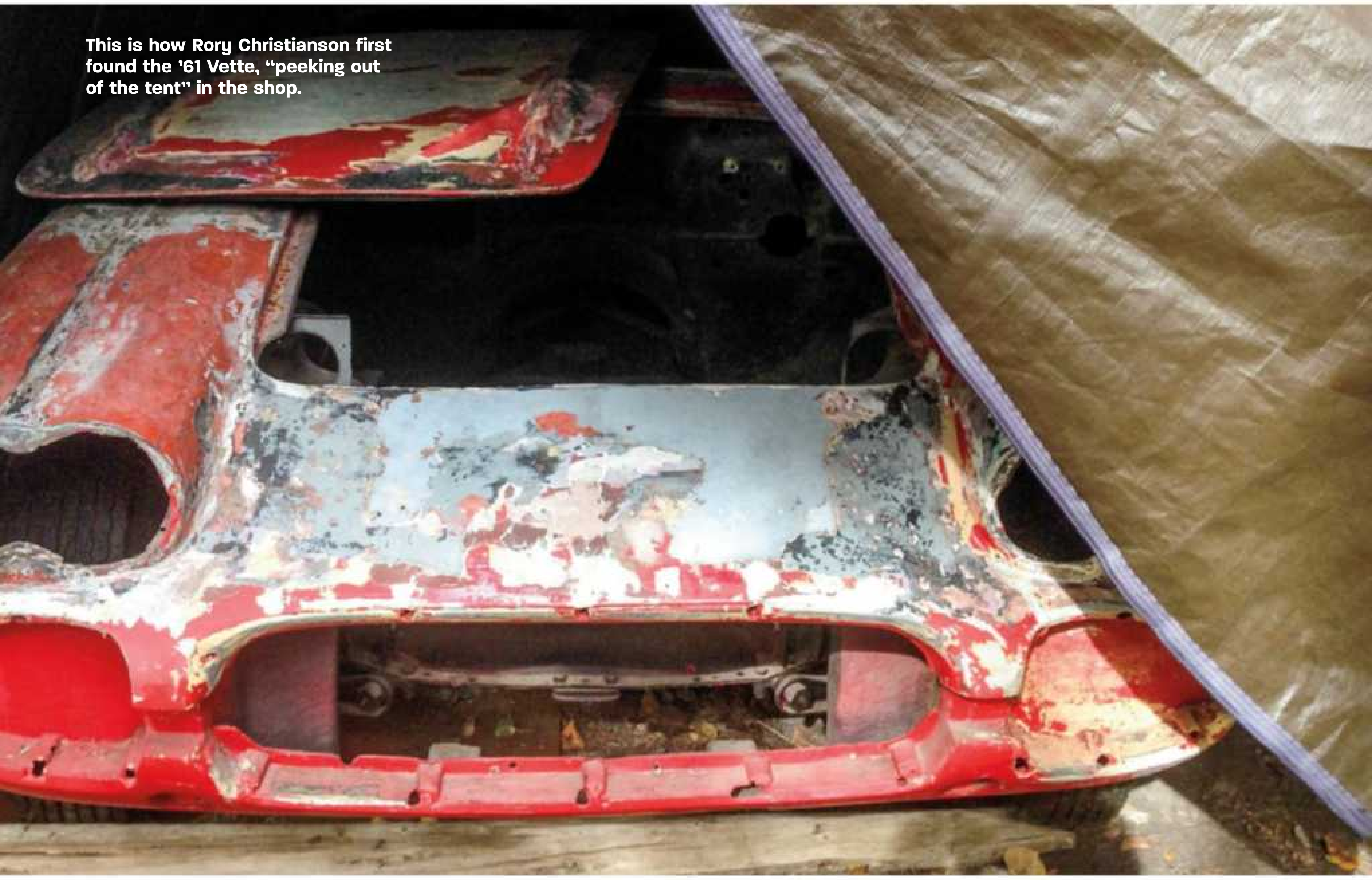
BY **JERRY HEASLEY**

THE VETTE ON THE HARD ROCK CAFE WALL



This is how Rory Christianson first found the '61 Vette, "peeking out of the tent" in the shop.

"The Hard Rock Cafe opened in 1995 in the West Edmonton Mall. That's where I first saw the car." Rory Christianson loves C1 Corvettes. When he made the 2-hour trip from his home in Stettler to Edmonton, Alberta, Canada, he would patronize the world's largest mall (at the time) to gaze at a real Vette "hanging on the wall." The red-with-white-cove '61 was a dazzling sight to behold a few yards away from a patron sipping on a bottle of Moosehead Lager. The classic had no engine or transmission, but the rearend, front suspension, frame and body were "all there."

"We could see the gauges, but they 'tarped' over the interior."

Bolting this C1 onto the wall must have required steel beams because the car even came with a set of old style Cragar SS wheels, tires, bumpers, windshield and more. The Hard Rock even turned on headlights and taillights to signal the place was open.

The cafe closed down in 2000. Christianson always wondered what happened to the Hard Rock Cafe Vette wall ornament. Then, one day he read an ad on Kijiji (pronounced ka-gee-gee and similar to Craigslist in Canada) for a '61 Corvette that needed a restoration.

After Christianson talked to the owner, Dan Edgar, he was intrigued to hear him say, "Do you remember the '61 Corvette that was on the wall of the Hard Rock Cafe?"

"Yeah."

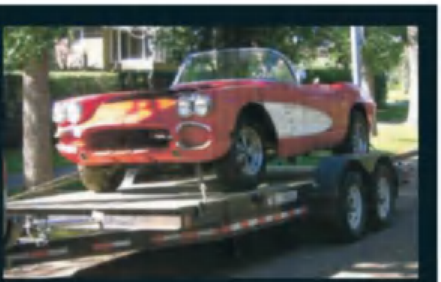
"Well, this is it."

Rory thought to himself, "I remember sitting there eating and drinking more than once and telling who was ever with me that I was going to own a C1 like that some day. I just didn't think I'd get that car."

Edgar lived on acreage just outside of Edmonton. He purchased the 1961 Corvette in 2005, five years after the Hard Rock shut down.

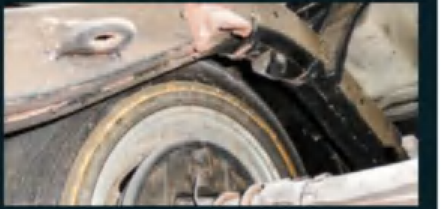
Christianson felt the $16,000 price "was a little expensive," so he didn't jump at the deal. "I think Dan was partially hanging onto the '61 hoping he could have the time and money to restore it."

Four years passed. Christianson didn't give up on the Vette. He talked to other C1 Corvette enthusiasts who thought Rory should be



Rory got this picture from Dan, showing the '61 on a trailer 10 years ago.

Christanson was able to find an old picture of the Hard Rock Cafe in the West Edmonton Mall. Now, he is looking for a photo of the '61 Vette on the wall.

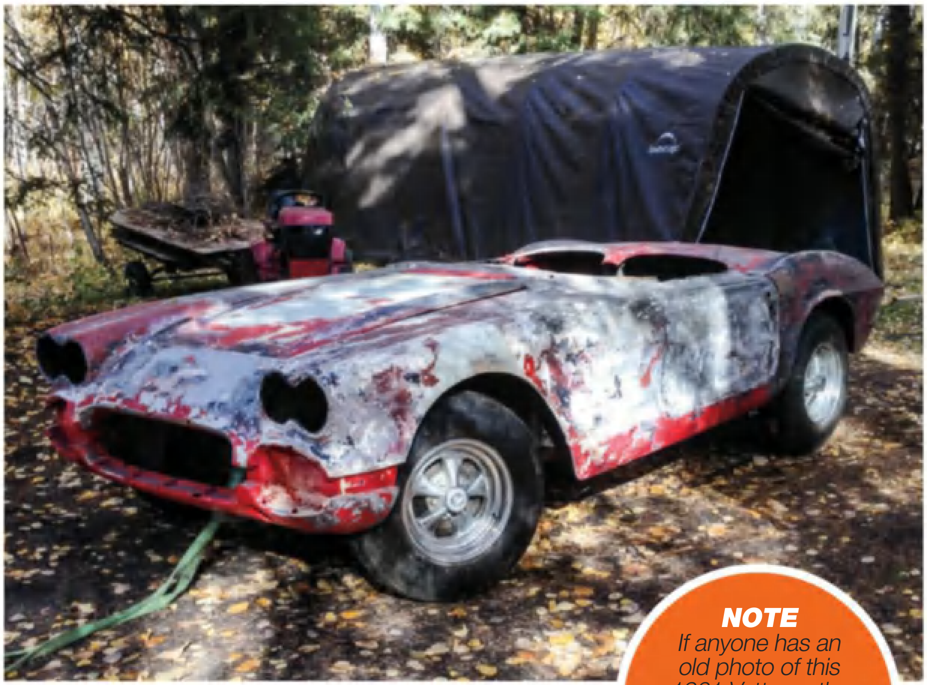


Christianson plans to remove the brackets, such as these two welded to the frame, that mounted the '61 to the Hard Rock Cafe's wall.

able to find a comparable project for maybe 10 grand.

"I looked around and couldn't find one for 10. I finally got him down to 13 and that's what I paid."

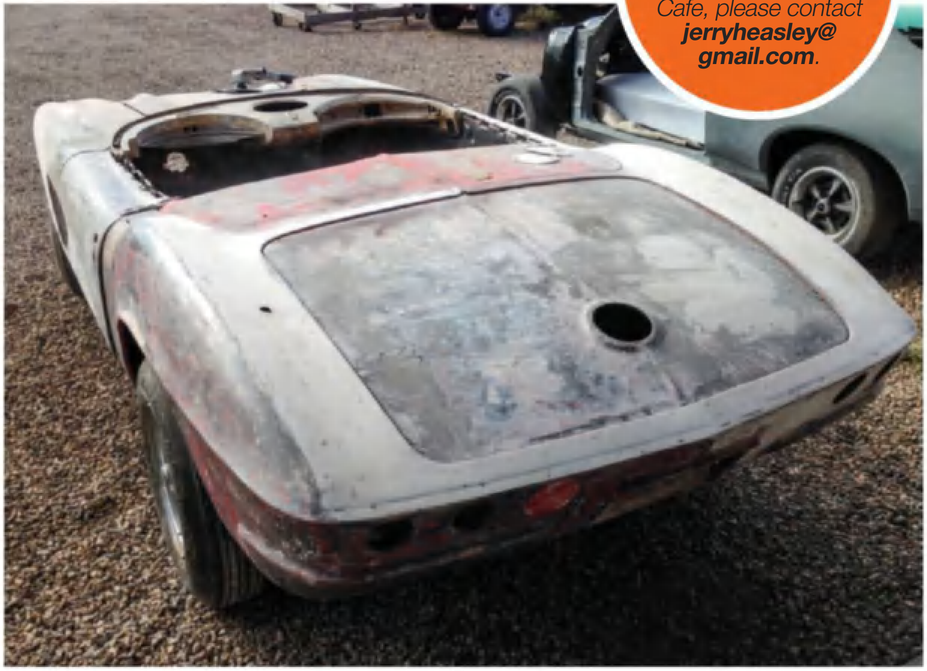
The date of the sale was October 4, 2015. Christianson's plan is to build the Vette to race in the Stock Eliminator class of NHRA and IHRA. I can think of the name of a famous restaurant to put on the side of the car. Christianson still has the brackets that bolted the '61 to the wall of the Hard Rock. But, I assume Christianson will be hanging trophies on his wall, not a C1 Corvette. **VETTE**



Dan had begun scraping the paint off the body.

NOTE

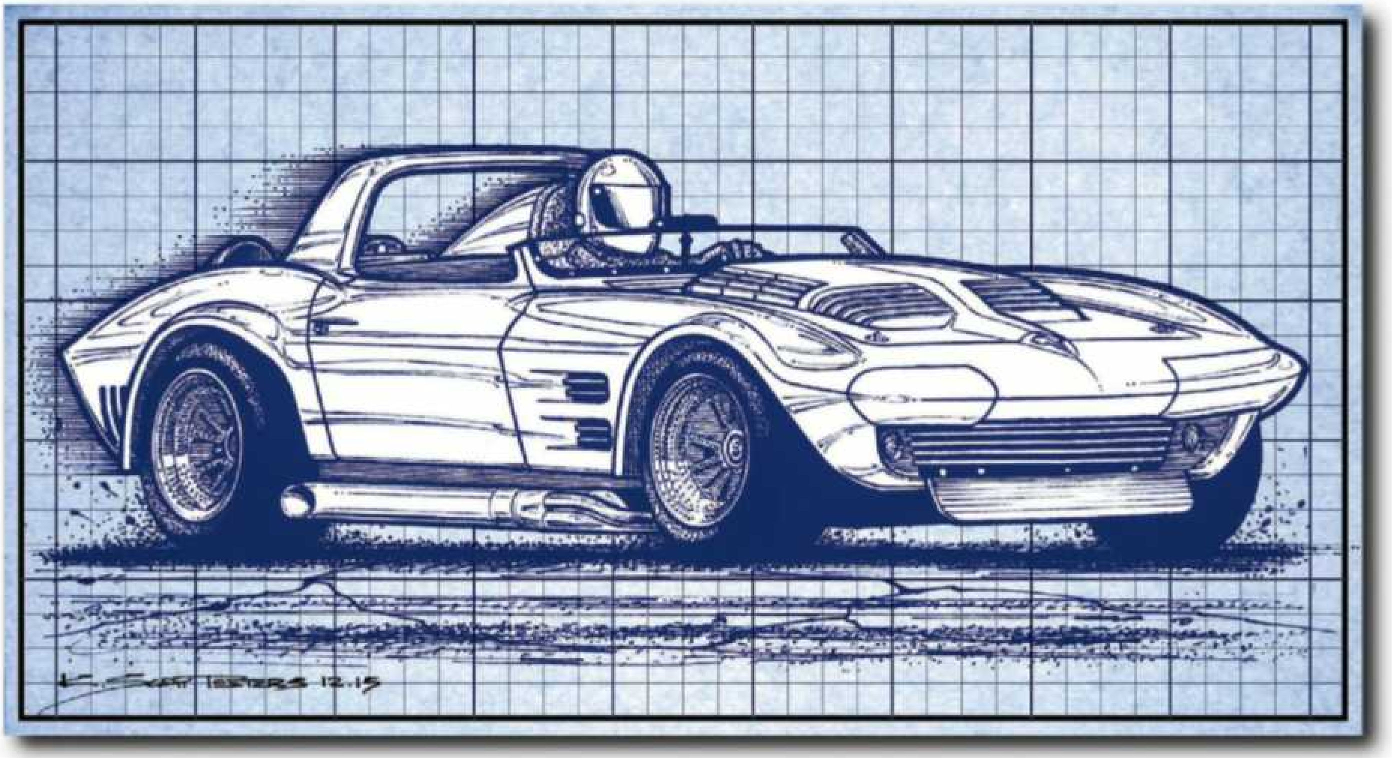
If anyone has an old photo of this 1961 Vette on the wall at the Hard Rock Cafe, please contact ***jerryheasley@gmail.com****.*



Christianson says the '61 came with a 283 and a four-speed, but what 283 he doesn't know. He is currently building the car at his shop, Passion Customs in Stettler, Alberta.

THE ILLUSTRATED CORVETTE DESIGNER SERIES NO. 227

BY **K. SCOTT TEETERS**



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On December 19, 1962, Chevrolet General Manager Semon “Bunkie” Knudsen submitted his request to the GM Executive Committee that consisted of Fred Donner, Jack Gordon, Ed Cole, and others, asking for an exemption for the Corvette from the 1957 ban on racing. Donner said he’d think about it. He indeed did, and told Knudsen, “No!” Imagine how Corvette history would have changed had Donner said, “Yes!” Duntov wanted to build 125 Grand Sports and then as many as 1,000 to be made available through Chevrolet dealers. The Grand Sport would have had continuous running changes worked into each new build. Well, it’s fun to daydream, but the lesson here is “development.”

Grand Sport Coupes #003, #004 and #005 were loaned to various teams for a few years. Remaining Coupes #001 and #002 were made into roadsters. Eventually, all five cars were sold to privateers. Amazingly, all were wrecked, except #002, but none beyond repair. Today, all five have been lovingly restored and are untouchable, unless you’ve got at least $5 million, maybe more.

Replica cars have been around for a long time and most are actually kit cars that use a donor car as a foundation. Companies such as Superformance have been building Ford GT40 and Cobra replica cars since 1996. These are custom, handmade-to-order replicas that are professionally built turnkey cars that can be almost identical to the originals. Before Duntov Motors was formed in 2007, there had been a few companies offering Grand Sport replicas, but these cars were based on C4 Corvette components, and were too often not so good. Enter Alan Sevadjian.

Alan has a unique background that made him want to build track-ready Grand Sport race cars. You see, Alan Sevadjian once owned one of the five original Grand Sport Corvettes, car #003. He owned the car from 1965 to 1968 and while he definitely “drove the car,” he never “raced the car” because he was only 19 years old and you had to be 21 to get your SCCA license. But Alan kept the driving in the family. His dad, Ed Sevadjian, co-drove the Grand Sport with some of the best drivers of the day, until 1968 when he sold off the car.

Alan Sevadjian went on to be a successful driver, winning four SCCA championships, and started a successful business building race cars and restoring Corvettes. Given the astonishing value of the five surviving Grand Sport Corvettes, I’m sure that most of the early owners have had the thought, “DRAT! Why did I sell my Grand Sport?!” “Seller’s regret” can run high in the Corvette community, but Alan decided to do something about it. By the early 2000s, he decided that since he already knows how to build race cars, why not build a duplicate of the Grand Sport he entered at Sebring in 1965? He knew that there was no way he could get away with using “Grand Sport Corvette” in his business name, so he went for something better: the “Duntov Motor Company.”

Zora Arkus-Duntov passed on April 21,

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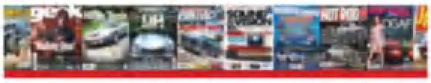

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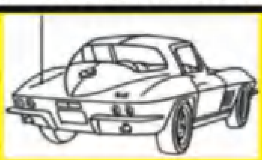

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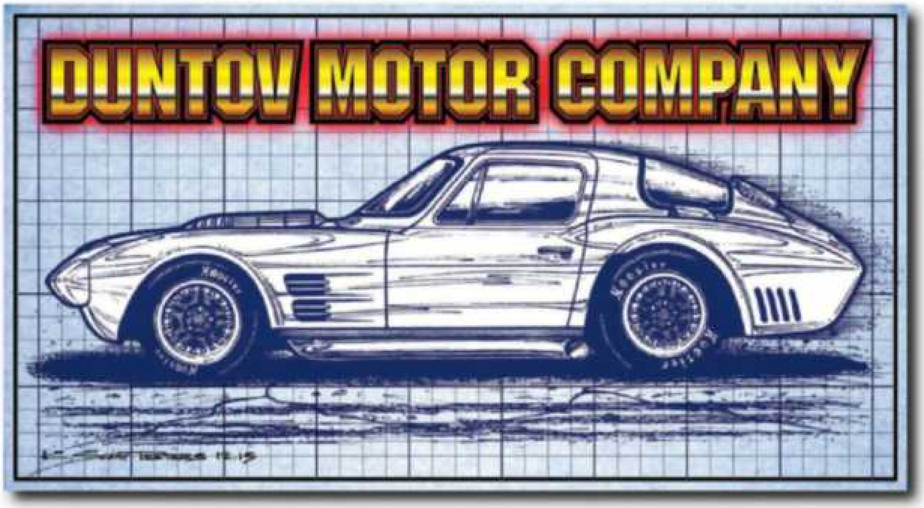


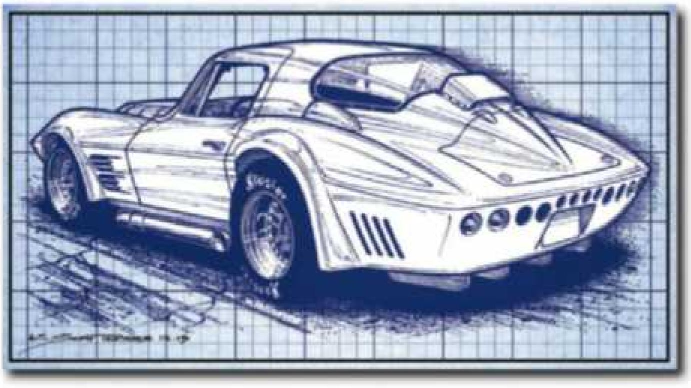
1996, at the age of 86, so Alan approached Zora's widow, Elfi Arkus-Duntov asking for the exclusive right to use the name "Duntov" for his lightweight race car business. Elfi knew from Alan's background as a former Grand Sport owner, racer, race car builder and Corvette restoration expert that he would do well by her family name. Mrs. Duntov wanted to introduce the Grand Sport and Zora to a younger generation of Corvette enthusiasts. Duntov Motor Company is based in Dallas, and their shop is just a touch north in Farmers Branch. The company officially builds Corvette Grand Sport race cars, as well as prepares and maintains race cars, full Corvette restoration services and trackside services. They also manufacture racing parts, including brakes, chassis and suspension for 1963-'82 Corvettes.

The first Duntov Motors Lightweight made its debut at the HRS Sebring Historic Race in March 2005. Those with a keen eye for midyear Corvettes immediately noticed the slightly altered front and rear of the car. The leading edges of the front and rear were indeed lower. What happened was when they made a two-part mold from a D&D Grand Sport customer car. The mold was fine, but drooped a little, which no one objected to. Many thought it was a deliberate enhancement to better manage the airflow over and under the car. After Alan made the licensing deal with GM, he acquired a set of molds and original full-size Grand Sport blueprints. The molds were made directly from original Grand Sport #002 while the car was being restored. Grand Sport #002 was the only one of the five cars that had never been wrecked. The body is now a spot-on replica of the original.

The tube chassis of the car is built exactly as the originals, including the Swiss cheese treatment on the frame's side rails. While the suspension looks vintage, it is completely worked out. The side tube cage offers driver protection and greatly increases the overall stiffness of the car. This allows for better control over suspension settings because the frame isn't twisting while the suspension is trying to work. Duntov Motors Continuation Grand Sport race cars start at around $120,000.

The official legal blessing from Mrs. Duntov helped lay the groundwork for becoming an official GM licensed product by 2009. Having the GM license allowed Duntov Motors to be able to partner with Superformance to give them the exclusive right to build and sell street versions of the Duntov Motors Grand Sports. Superformance was already successfully building Cobra and GT40 replica cars that are built to look like the originals. The workmanship and attention to detail, as well as being able to custom tailor a car to the owner's preferences, is well known. Duntov Motors has designed the chassis so that any of GM's crate engines can be easily used—anything from a 350hp ZZ4 iron crate engine to an all-aluminum LS9 with 638 horsepower. While we all love big power numbers, 350 hp in a 2,500-pound car yields a power-to-weigh ratio of 7.14:1. Using an LS9 lowers the ratio to just over 3.9:1. With one of the Duntov 850hp aluminum big-blocks, the ratio is pounded down to an insane 2.94:1!

The Duntov Motors race cars are essentially period correct, with all the bugs worked out—as if Chevrolet and Duntov had been able to hone and develop the Grand Sport. But even all fixed-up, the car still delivers a 1960s race car experience. Those power-to-weight ratios read sexy, but the car is riding on tires that are only around 9 inches wide. Controlled drifting is the proper driving style for a race car such as this, if the driver has the nerve. It's totally different from racing a modern car with very wide, very sticky tires.



Alan Sevadjian shared an insight into the original Grand Sports. Most stories about the original cars make mention of the dreaded front-end lift that some drivers claimed made the front wheels come off the ground, or at least made the steering feel "floaty" at speed. However, Zora was okay with that because it provided more weight transfer and helped with traction on the over-powered car with not enough tire. Well, easy for Zora to say, he wasn't driving in race car traffic. The other common complaint about the original cars was instability under braking. Remember, the original Grand Sports never got the development they needed and some of the suspension parts were inadequate. When drivers hit the big Girling disc brakes, the A-arms flexed, and the car literally leaped sideways! Those same components are now built with thicker chrome-moly steel, eliminating the problem.

What's next for the Duntov Motor Company? Before Zora's Grand Sport project came to a screeching halt thanks to Mr. Donner's decision to reject Knudsen's request for the Corvette to be exempt from the "No Racing" ban, Duntov was planning to take a team of Grand Sports to race at Le Mans. So, the Duntov Motor Company has built two Grand Sports intended for Le Mans. The first is already at the Callaway operation in Germany, with a team working to get homologation certification. Hopefully, we'll see the first ever appearance of a Grand Sport Corvette at the 2016 Le Mans race. Zora and Elfi would be thrilled! **VETTE**

K. Scott Teeters

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